

NEXTWORLD

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Baedeker to
NeXT Networks



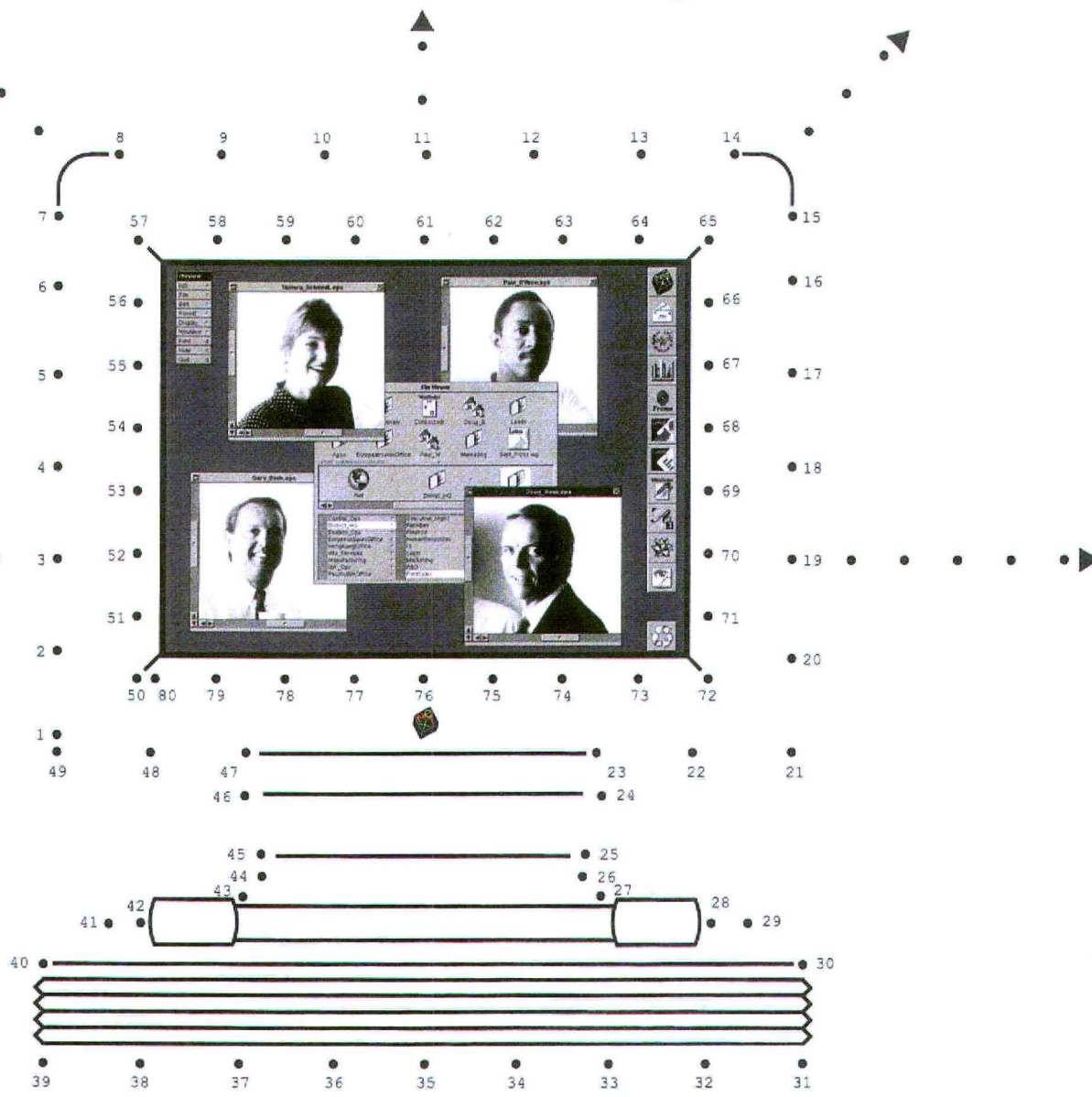
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Associate Publisher Jeannine Barnard
Editorial Director Daniel Ruby

EDITORIAL

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Senior Editor Dan Lavin
Senior Editor Simon Garfinkel
Copy Editors Eliot Bergson, Laura Fredrickson, Sue Troy
Contributing Editors Joe Barello, John Perry Barlow, Tony Boyle and Cheryl Rhodes, Don Crabb, Joe Hutsko, Daniel Miles Ichoe, Robert Lauriston, Charles L. Perkins, Richard M. Reynolds, Seth Ross, Bruce Webster

ART AND DESIGN

CKS Partners San Francisco, California
Brent Croxton Croxton Design

PRODUCTION

Director of Manufacturing Jayne Boyer
Manufacturing Manager Hilal Sala

ADVERTISING SALES

Account Representative Jacqueline Caldwell
415/978-3188

ADMINISTRATION

Operations Manager Graciela Eulate
Director of Information Services Kevin Greene
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CIRCULATION

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Circulation Manager Jaana Nieuwhof
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Fulfillment Coordinator Michael Goldstein
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IDG CORPORATE ADMINISTRATION

Director of Finance Vicki Peilen
Financial Analyst Madeleine Buckingham
Accounting Manager Pat Murphy

To reach *NeXTWORLD* by mail or courier, use this address:
NeXTWORLD, 501 Second Street, San Francisco, CA 94107.
You can also contact *NeXTWORLD* via the Internet at
nextworld@nextworld.com, via MCI mail at *NEXTWORLD*,
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Geopolitical changes can happen suddenly, but their impact doesn't settle for a long time. The Berlin Wall came down in a week, but the New World Order has a long way to go. IBM and Apple stood up in public, but a new object-oriented operating system standard is quite a few years off.

There will be plenty more shocks and shifts in the landscape before the future terrain of the desktop computer market is determined. A process has been set in motion, in part by NeXT's leadership, but mainly by the inevitable forces of technology and business.

On these shifting sands, NeXT still has the opportunity to emerge as an important player. But it has to be nimble—prepared to discard strategies that aren't working, ready to seize any advantage it can find. It may not be able to plot a course with certainty, but by reacting quickly, NeXT can ensure itself a significant place in the future industry alignment.

NeXT's IBM deal is apparently finished, but the problem that originally led it to license NeXTstep still exists. The small number of systems sold by NeXT is insufficient to convince major software publishers to develop for NeXTstep. Without sufficient software support, NeXT cannot sell a large number of systems.

The way out of this Catch-22 is to put NeXTstep on other hardware platforms. That was the plan with the IBM deal. Now NeXT needs a new partner, or else it can go it alone.

The choice of platforms is fairly limited. Since it needs to build an installed base quickly, NeXT can't wait for future systems to develop. It needs to look at hardware that is available today or in the near future. That includes Intel 486 and 586 PCs, SPARC systems, and Macintoshes.

The truth is that NeXT doesn't need a partner to get on one or more of these platforms. NeXTstep and Mach are portable enough that NeXT can produce versions for other computers, selling its OS as shrinkwrapped software. With NeXTstep's well-known advantages, plenty of customers will buy it as a replacement or complement for their computers' native operating systems.

Because each platform's microprocessor has its own instruction set, software developers will have to recompile their products for the different versions of NeXTstep—a headache for them, for resellers, and for users. But that will be true for Microsoft, Apple, IBM, and other OS vendors, too, since everybody will be doing portable operating systems.

Of the platforms mentioned above, the Intel and SPARC chips are used in systems that have open designs. Porting NeXTstep to run on either high-end PC clones or SPARCstations would not be difficult. The Mac would be more challenging, even though it uses the same chip as the NeXT, because it has a closed architecture with unpublished hardware interfaces. Still, NeXT's engineers should be able to manage it.

With NeXTstep running on any one or several of these platforms, developers would have added incentive to develop for it. There would be more customers for their products. Catch-22 would finally be history.

But there could be a new problem. Sales of NeXTstep for other platforms could eat into sales of NeXT's own computers. While becoming primarily a software company it might be a viable option, NeXT wants to keep selling hardware. To do that, NeXT has to keep its own hard-

ware ahead of the current standards. NeXTstep on another platform should not be as good as NeXTstep on a NeXT computer.

Of course, NeXT will have to keep improving its price/performance and continue to add innovative hardware features to maintain its current technology lead. There it runs into another problem. The 680x0 architecture of the current NeXT machines may not have enough growth potential to keep up with the advancing chip architectures of other platforms.

So NeXT has a critical decision to make on which chip family to use in its next-generation systems. It can stick with Motorola, waiting on the 7050 or moving to 88000 RISC architecture. It probably can't afford to wait for the new Motorola chip that's based on the IBM RS/6000. On the other hand, Intel's 80586 looks like it is on course for next year. SPARC is also an option, as are the MIPS R3000 and R4000 that will be used by Compaq, DEC, and others.

I don't know which chip NeXT should go with. It doesn't matter whether it is RISC or CISC, as long as it has high performance, rapid

growth potential, and is available soon. But assuming NeXT chooses its hardware well, it should be able to maintain its technology lead over competitive systems. And if it combines an aggressive hardware strategy with a portable operating system, then it has a good chance to attain real critical mass by the time the earth stops rumbling.

★ ★ ★

All of that remains in the future. Now comes some nitty-gritty from the here and now. Last time, I gave my list of the Ten Most Wanted developments in NeXT technology and marketing. We received a strong response from readers,

the most interesting of which are compiled in our Openers department.

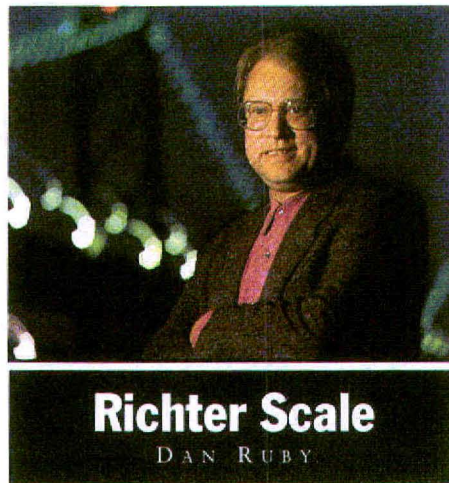
But let's take another look at my list. Number 2, a database front end, is closest to being checked off [see "Covering the (Data) Bases" in this issue]. Lt. Sullivan has heard some interesting rumors about Number 6, a cheap color printer. There are also good signs on Numbers 1 and 3, page layout and CAD software. And Number 9, integrated communications, took a step forward with the Hayes ISDN modem.

Number 4, 3-D graphics and animation, has me baffled. Pixar keeps making news with RenderMan on other platforms, while NeXT seems like a poor cousin. Number 5, a color upgrade path, is still just a wish. If any of the speculation about non-68000 processors comes to pass, the question of upgrade paths is going to become much more complex.

The past three months have produced no major change in Number 7, a powerful marketing message, but I have confidence that NeXT's new marketing team is refining the positioning. There are no details to report yet on NeXTWORLD Expo, and there was no discernible change on Number 10, service and support.

Overall, there's movement. By next issue, we might be able to check some off. Then we'll add the most-named reader items, and keep a Billboard-style running tally. There are a few items from our earthquake scenario that could easily make Number 10 with a bullet. ☘

DAN RUBY is the editorial director of NeXTWORLD.



Richter Scale

DAN RUBY

PHOTOGRAPH BY VOLDI TANNER

WINTER 1991 NeXTWORLD 3

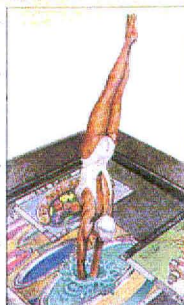
Step-by-Step: Plunging Into Color

by PAUL PRUNEAU

The cover of the Fall 1991 issue of *NeXTWORLD* provided a dramatic example of the capabilities of NeXT's color systems. Here's the answer to numerous requests asking for details on how we did it.

1 The idea for the cover was developed at a creative concept meeting among Dan Ruby, the editorial director of *NeXTWORLD*, and Tom Suiter and myself, members of the design firm CKS Partners.

We wanted to communicate that the NeXT was making a big splash in the realm of color technology. Creating the sketch was easy—we only needed markers. Creating the final image would require several photo shoots and hours of electronic photo manipulation by someone skilled both with the NeXT and in illustration. Luckily, Keith Ohlfs, NeXT's illustrator/programming-genius-in-residence offered to help.



2 To create the first image on the NeXT's screen, San Francisco photographer Paul Matsuda assembled and shot a custom palette of the paint cans our model would dive into. Ohlfs then scanned a transparency of the image into a NeXT-dimension with 64MB of RAM. Ohlfs corrected the colors of the image with custom image-editing software.



3 The other images on the NeXT screen were created with the NeXT version of Adobe Illustrator. The idea was to show off some of the applications for the new color systems and the new Illustrator program. We saved the images as EPS files, then sheared and rotated them into the perspective that would match the layout.



4 CKS Partners held a casting session to find a diver who had the right proportions for the redesigned magazine cover. We cheated a bit here. The diver wasn't really diving. Instead, she was suspended from a pull-up bar in the photo studio. This photo, too, was scanned into the NeXTdimension.



5 The paint splash was a particular challenge. It had to look convincingly like the kind of splash that would be made in a paint can by a diver, and also be of a pro-

portion, scale, and shape that could be integrated into the assembled image. We took dozens of photographs of splashes and scanned the best ones.



6 With all the component images scanned in, the real work began. Using his custom image-editing program and a template made from the original sketch, Ohlfs selected, enhanced, color-corrected, and composed each element according to the layout. The NeXT's unique alpha channel made it possible to create subtle blends and transparent overlays as the individual images were assembled and adjusted. The speed of the NeXT's



color display made it possible to try different effects as the image came together.

7 Ohlfs saved the final composed image to optical disk as a 16MB encapsulated PostScript file, which we sent to a NeXT-equipped service bureau for output as film.



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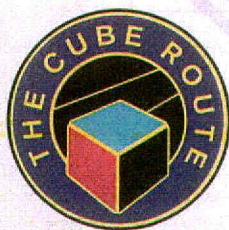
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PAUL PRUNEAU is the creative director at CKS Partners, the design firm responsible for the redesign of *NeXTWORLD*.

The New NeXTWORLD

I love the new issue. I've been reading it for hours and am still finding hidden gems in the folds of its pages. It's worth waiting a quarter if this is what we'll get.

ERIC CELESTE
Cambridge, Massachusetts

This issue is different. There is actually useful information in it that I hadn't already heard about from other sources. I'm impressed.

LOUIS A. MAMAKOS
College Park, Maryland

Well, you're a real computer magazine now: You've got cheesecake on the cover.

ANGUS MACDONALD
Concord, California

I knew that changes were in store, and had expected improvement, but my expectations were exceeded. The only thing I miss is Dock Soup.

M. CARLING
Palo Alto, California

Shallowness and trendy design have prevailed. Banal and predictable thinking has replaced a groundbreaking publication with the same old hackneyed formula.

Please cancel my subscription.
CORY MAYLETT
Salt Lake City, Utah

Issue 3 represents an improvement of several orders of magnitude over the previous two. I would, however, nudge its balance a bit towards the technical side.

ANTHONY M. ROTH
Cambridge, Massachusetts

More Most Wanted

I enjoyed your comments on what NeXT needs to do ["Ten Most Wanted," The NeXT World, Fall 1991]. I agree with all of them except number 2, "A full-featured, programmable database front end." First, there has to be a decent

DBMS at an affordable price.

What NeXT needs to do (and quickly) is build its own DBMS. Nothing fancy, just some back-end capability that can be called from Objective C programs. This would give developers a complete development environment and shield them from compatibility problems between a third-party DBMS and NeXT. How do you explain to your clients they can't have 2.0 because Sybase isn't ready?

With the back end provided by NeXT, you would see a host of front ends for end users from third-party vendors.

JIM ENGEL
Burlingame, CA

See the article "Covering the (Data) Bases" in our Special Report in this issue for a rundown on NeXT's database support plans. — NW

I would have put number 10 first. The computer industry has been terrible as it applies to customer service, and customer service is especially important with such a versatile (complicated) product.

CHRIS CUILLA
President, The Cuilla Company
Grayslake, Illinois

Because our "Ten Most Wanted" list drew so many interesting responses, we decided to make a regular space for readers' suggestions to NeXT. Look in our Openers department under "Most Wanted" for the most provocative suggestions we receive. — NW

All Thumbs

I really appreciated your [Barlow & Lavin] review column in the Fall 1991 NeXTWORLD. The "Siskel & Ebert" style was most effective,

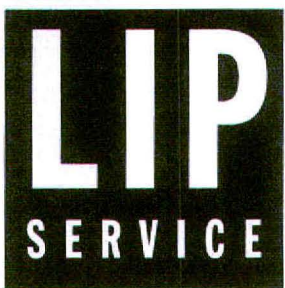
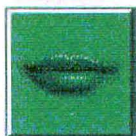
but your single "thumbs up" or "thumbs down" rating system is perhaps too simplistic. You recognized this yourself when you had to split the NeXT Support review into two ratings.

The thumbs down rating for FrameMaker led me to assume it was a "bad" package. On reading the text, I found that it served my exact needs (my bioengineering thesis — lots of formulas, rigid format, many chapters long).

Perhaps in the future you could put multiple thumbs for different user requirements, e.g., graphic

artists: thumbs down; technical publishers: thumbs up.

JOHN
VAN HETEREN
Berkeley, CA
vanhet@garnet.berkeley.edu



Globe Trotting

The focus of the magazine seems to be on events and news in the United States. It focuses on American products, American developers, and the American

NeXT community.

At NeXT we anticipate that our sales in Europe will be about 30 percent of NeXT's worldwide sales during 1991. We are really pushing all of our developers to localize their products. Perhaps NeXTWORLD should also follow suit, and localize its product as well.

MARY MCNABB
NeXT technical support

We agree. In this issue, see our feature "NeXT Goes Global," for a primer on NeXT's overseas policies and the first reports from some of our overseas correspondents. In the future, overseas news will have its own space in the Field Reports section of our Community department.

We'll also be expanding our overseas distribution, with copies on newsstands and at NeXT dealerships in Europe and Asia. — NW

Not so Fast, Guy

In "Deja Vu" [Vanishing Point, Fall 1991], Guy Kawasaki said, "If NeXT defined a market for professional workstations with black cases, they could claim 100 percent market share." Not true.

The first black workstation to actually ship was a Mac II that I painted back in 1988. To date, NeXT has probably only shipped around 99.8 percent of all black workstations. Since I don't paint Macintoshes any more, and nobody wants his NeXTstation painted beige, NeXT's market share will probably continue to increase.

Guy, you should know better than to wear denim shirts with buttondown collars, and you certainly should be aware of the black Macintosh phenomenon. After all, you've got one sitting on your desk. I should know. I painted it.

DAVID SIEGEL
Palo Alto, California

Corrections

In NeXTWORLD Extra (September 1991), Marble Associates' Teleconnect was confused with Decision Builder, an entirely separate product. Decision Builder is a toolkit for building decision support and is not yet shipping.

Street Prices (Fall 1991) mistakenly listed Diagram! 2.0. The current shipping version of Diagram! is 1.1.

NeXTWORLD welcomes your comments. Please send them to Letters at NeXTWORLD, 501 Second St., San Francisco, CA 94107, or e-mail letters@nextworld.com.

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OPENERS

NeXT, with widening support from computer buyers, is making a surprising comeback — just as industry events may undermine progress. [NeXT's quarterly results] put it on target to achieve \$200 million in 1991 sales. "This is a very respectable accomplishment," said Richard Shaffer, editor of Computer Letter. "Steve is beginning to gain credibility."

— G. Pascal Zachary, Wall Street Journal, June 27, 1991

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Developer tool that links Improv to Sybase.
For price, contact Objective Technologies

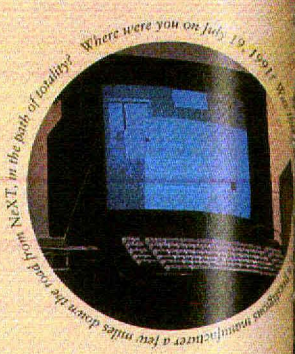
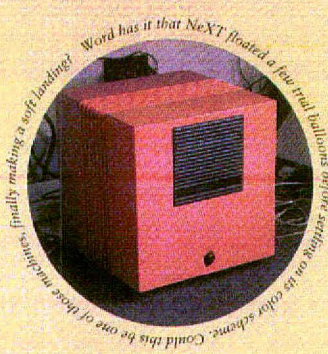
Peripherals

Color Digital Eye

Metaresearch
Digital Eye with color support.
\$1195

For information on these products, contact your NeXT product dealer. Manufacturers: If you have a product shipping for the NeXT, please write us at NeXTWORLD, New Products, 501 Second St., San Francisco, CA 94107, fax 415/978-3196, or send e-mail to newprod@nextworld.com.

MYSTERY PHOTOS



Answer at bottom left.



MOST WANTED

Judge by responses to the Ten Most Wanted list in Dan Ruby's column in our last issue, readers have a lot to say about what they want in their NeXT systems. We've reprinted some of the most interesting ideas here. In the next issue, we'll debut a ranked listing, then keep a running tally of the ten most wanted features. To add your vote, write to Ten Most Wanted, NeXTWORLD, 501 Second St., San Francisco, CA 94107, or e-mail nextworld@nextworld.com.

- 1. A bubble-jet printer similar to Apple's StyleWriter, costing about 10 to 15 percent of an entry-level slab.
M. Carlog, Palo Alto, California
- 2. Distribution of Extended BS on CD-ROM so users have a way to recover from corrupt file system problems.
- 3. A very low cost, entry-level system, perhaps best achieved by removing the internal hard drive and floppy from the Station and offering an expansion box for peripherals.

- 4. A part to the Intel '486/XVGA environment. NeXT should get out of the hardware business and sell NeXTstep.
- 5. A 900 number for support for those of us who don't need several thousand dollars worth of support, but are willing to pay as we go.
Charles Lloyd, Stamford, California
- 6. Direct system support for reading/writing Macintosh disks.
- 7. A NeXT vs. everyone else ad campaign. We know the NeXT is the greatest thing since squeezable relish jars, but the rest of the world is missing the show.
- 8. A NeXT-specific voice-command product similar to Voice Navigator for the Macintosh.
Chris Gulla, Grayslake, Illinois
- 9. Free NeXTstep. History shows that it just won't spread far unless it is made freely available for a variety of platforms.

- And NeXT will benefit by expanding and solidifying its market.
- 10. A SCSI optical drive compatible with the original OS, so it can be used as a peripheral to a NeXTStation.
- 11. A 25MB floppy drive as standard. This would allow NeXT to distribute the entire OS on floppies (a minimal OS would be on a single floppy, and that would be enough for it to boot strap to the full 200MB Extended Release).
- 12. Lower prices on NeXT memory, which is currently outrageously priced at four to five times the market rate.
Dr. Barry Merriman, Los Angeles
- 13. Better icon and screen management capabilities to permit selective grouping and hiding of icons generated by different projects using the same icons.
- 14. Multitasker project management.
Greg Shannon, Bloomington, Indiana



Oh, those wild and crazy hackers from the Media Lab. The pink Cube is the result of a prank played on Pascal Cheneaux, moderator of comp.sys.next.announce, the black sun belongs to Mike Hawley, author of the original Digital Liberator, who wanted it to match his Cube.

If you had labeled Steven P. Jobs a has-been, get your eraser ready. The co-founder of Apple Computer, who has been trying for six years for another hit at his new firm, NeXT, finally had good news Wednesday. NeXT's second-quarter revenue hit \$46 million, up 86% from the first quarter.
— Kathy Rebello, USA Today, August 1, 1991

Software Product	Best price	Where
1. 3.5-inch disk drive (IBM)	\$7995	NeXT or any dealer
2. 3.5-inch disk drive (IBM)	\$3995	NeXT or any dealer
3. 3.5-inch disk drive (IBM)	\$37	Chip Merchant, 800/426-6375
4. 3.5-inch disk drive (IBM)	\$145	Chip Merchant, 800/426-6375
5. 3.5-inch disk drive (IBM)	\$12.95/10	Fry's Electronics, 408/733-1770
6. 3.5-inch disk drive (IBM)	\$72.95/10	Fry's Electronics, 408/733-1770
7. 3.5-inch disk drive (IBM)	\$1413	Fast Access, 708/530-7749
8. 3.5-inch disk drive (IBM)	\$2086	Aurora Industries, 800/426-1581

STREET PRICES

Software Product	List	Street
WordPerfect 1.0.1 (WordPerfect)	\$495	\$325
Diagram! 2.0 (LightHouse Design)	\$499	\$339
TextArt 1.0 (Stone Design)	\$375	\$319
Improv 1.0 (Lotus Development)	\$695	\$549
Illustrator (Adobe Systems)	\$699	\$459
SoftPC (Insignia Solutions)	\$499	\$329

These are the best prices we could find as of press time, on in-demand NeXT products. You should be able to match the price with a little shopping.

77. English physicist (b. 1902)

80. No. 2 exec.

81. Easy decision, according to Steve

85. "I can see — ..."

88. Muray

89. Dear old

90. NeXT software versions, according to Steve

94. Chasm

96. Label company

97. Spider crab

99. Comfort

103. Storefront sign

3. Razor brand

4. Fertilization option: in —

5. Level of command

6. Bard

7. Foot salts

8. Scabard

9. Britt. fliers

10. Free software company

11. Mass. user group

12. Coffee island

13. Spokeswoman Bryant

14. Alain —, high-tech realtor

15. Mixes

17. Corp. communications

46. Socialite Hogg

53. Finale

54. Yellow vehicle

55. Building wings

57. Spanish article

58. Pung producer

60. Weap

61. Story or thread

62. Italian given name

63. Claudius's foot

64. Pierre's friend

65. Capek novel

68. Aye or Paul

69. Length x width

70. Disk or currency

73. Unit of pressure

74. Serious

78. Thespian

79. Overdo

82. Beseech

83. Employ again

84. Permitted

86. D — G connection

87. Mach 1 pilot

90. Dartmouth language

91. Diele

92. Raquette Monica

93. Weight-loss programs

95. Don't — dead horse (2 words)

98. Unit of matter

100. Charlie Brown's cry

101. Hoof-on-pavement sound

102. Poet St. Vincent Milly

104. Top money exec.

105. Scanner co.

106. Student exchange prog.

107. Brit. admiral (1758-1805)

21. Hommed

22. Forward surge

26. Spock's journey

28. Fruit drink

30. Initiate

31. President Fillmore

32. Belonging to

33. Israel's Eben

34. Humdrum

35. Card game

39. Gandhi's homeland

40. Unknown author (abbr.)

41. Lavish attention upon

44. Sequiter prefix

45. Fast plane

Solution on page 48.

STEVE-ISMS

104. Purpose of

computers, according to Steve

108. — of March

109. Stallman's org.

110. School or collar

111. Goat (2 words)

112. Dirty pool

113. 256MB platters (abbr.)

114. British topology org.

115. DOB computer buyer

DOWN

1. River craft

2. Sufficient (abbr.)

Art Imitates Life

If Kitty Kelly had written about the icons of the personal computer industry, she couldn't have gotten much more personal. But in *Silicon Dreams* (Knightsbridge Publishing, \$19.95), a forthcoming novel by Joe Hutsko, who is a former employee of Apple and NeXT, the names have been changed to protect the innocent. The book was produced entirely on NeXT systems (see "Instant Books" in the Community section of this issue).

Cast of characters

Scott Jones, the mercurial genius who invented the world's first personal computer company, Approach Computer.

David Sullivan, quintessential company man and beverage marketing genius, who has a secret plan to save Approach.

Swoozy Sullivan, former hand model who parts with more than a career when she becomes Mrs. David Sullivan.

William Harrell, chairman and CEO of the world's largest computer company — International Computer Products (ICP).

Ivy Green, brilliant and beautiful, whose new idea is the spark for Jones's next-generation system.

Kate McGregor, Jones's '60s folk-rock girlfriend, proves to be both loyal soul mate and mother of invention.

Hank Towers, co-founder of Approach, financed the company after meeting Jones at a high school science fair.

Byron Holmes, retired ICP heir who feels young again after meeting the reclusive Jones at his Maine vacation home.

Laurence Maupin, David Sullivan's attractive press assistant, who has schemes of her own.

Jean-Pierre Poltras, polo player and horse trainer, who shows that corporate politics can be less complex than affairs of the heart.

It seems that Mr. Jobs's eternal search for perfection is often his worst enemy. He has gone out of his way to discourage software developers from just copying their existing programs to his computer — instead holding out for first-time original creations.

—John Markoff, *The Executive Computer*, New York Times, August 11, 1991

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JOE HUTSKO

the instruments. By the time they finished out the score, they were twisted around each other like players in a stocking-foot party game.

"Whew!" piped Scott, thrilled, as the last tones dissolved.

"Yep, it's the foundation of an architecture that, in this application, can teach kids how to play music both individually each with their own personal instrument—as well as in an overall classroom orchestra."

Scott rubbed his palms together briskly.

The ISLE prototype incorporated Byron's remarkably efficient input/output processor design, which conducted the attached Nomad computers as individual "instruments" of a simulated "orchestra." This somewhat metaphor, when teamed with a...

12

JOE HUTSKO

Just a year and half ago, *Business Week* had touted Scott and David as "The Brains and Brawn of Silicon Valley." Gracing the cover was a jocular photograph of the duo. It was an insightful, undisguised shot, like the sort taken by Annie Leibovitz for the covers of *Vanity Fair*. The overall effect was similar to the concept that that magazine might use to promote Hollywood's latest "buddy" film. Their expressions were timed perfectly, as if the photographer had released the shudder in sync with the delivery of a punchline. On the left stood Scott, wearing jeans and a white oxford shirt. He was of slight build and even slighter stance. His shirtsleeves were rolled to the elbow, and his arms were folded nimbly across his chest. His physical composure was that of a lanky high school student, yet his eyes had the depth of a twenty-coat lacquer finish. They told of a man who was living beyond his physical years, of a mind that performed at a cycles-per-second rate equal to those of three men combined. He was thirty-one.

Beside Scott stood David, with one arm hung loosely over the younger man's shoulder. He wore khaki pants and a chambray work shirt. Like Scott, he wore his sleeves rolled to the elbows. His sparse light brown hair, his high, time-worn forehead, and the creases of his face, especially around the eyes, gave the viewer the impression of a man in his mid to late forties. The color of his eyes was more gray than blue, and they burned with the determination of a college graduate who, diploma fresh in hand, sprints eagerly toward the challenge. He was forty-two.

The undercurrents had started a little over a year ago, when, after its introduction, the Nomad computer was only mildly accepted by the buyer. Though the computer won accolades from the industry for Scott and his team of engineers for its breakthrough technology, buyers

Vendor reports always outstrip analysts' numbers. Come to IDC's library and try to find a vendor and a report concerning on anything. The word "press release" comes from the Latin "to exaggerate one's unit shipments." Strip away Jobs's marketing stumbles and lack of profits, and you have one of the most inventive boxes since the Macintosh.

—David Atlas, Senior Analyst, International Data Corporation, in a letter to Forbes, June 24, 1991

HARDWARE

Canon
Double-Sided
Optical Disk
Canon USA

1

WordPerfect
1.0.1
Microsoft Corporation

PLI
SuperFloppy
2.8 Floppy Drive
Peripherals Ltd.

2

Adobe Type Library
Adobe Systems

Interfax
24/96 NX
Fax/Modem
Abnott Technology

3

Diagram! 1.1
LightHouse Design

CubeFloppy
2.9 Floppy Drive
Digital
Instrumentation
Technology

4

SoftPC 2.0
Insignia
Solutions

DoveFax
Fax/Modem
Dove Computers

5

FloppyWorks 2.2
Digital
Instrumentation
Technology

SOFTWARE

Living Color

When six college classmates become inspired by Steve Jobs's visions and then find two years after graduation that their professional jobs are unsatisfying, the obvious solution is to share a house and a NeXT software development business.

That was the case for the partners of Lighthouse Design, producers of the Diagram! software tool, who, while attending Carnegie Mellon University, heard Jobs speak there in 1985. "His point

was that when you're young and already in debt from attending college, that might be the only chance you're ever going to have for something as radical as starting your own company," explained Roger Rosner, leader of the engineering efforts for an upcoming Lighthouse product.

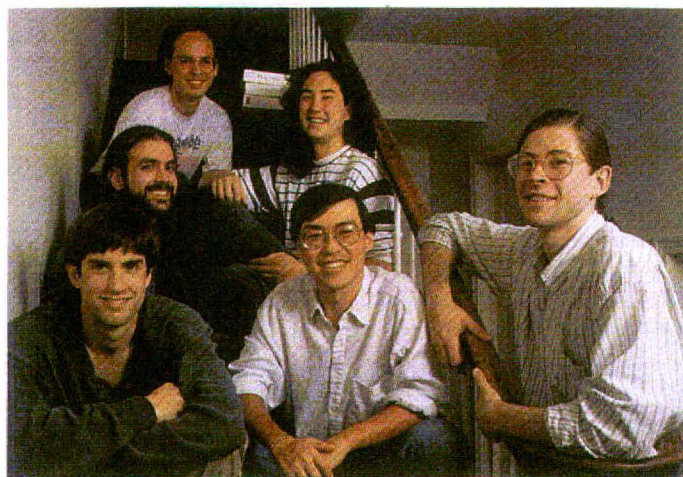
The six 25-year-old entrepreneurs weren't concerned by their lack of business experience. "We had the sense we could handle 90 percent of whatever was necessary to create a successful business. On the other 10 percent, we knew we'd have a baptism-by-fire," says Jonathan Schwartz, Lighthouse's leader of marketing.

They set up shop in a comfortable, older house in a wooded sec-

tion of Chevy Chase, Maryland, just outside Washington D.C., which serves as both office and home for the young men. "Most people like to separate their work lives from their personal lives," said Rosner. "We like being at it

originally known as BLT, for Box and Line Tool.

Diagram! provides not only traditional illustration capabilities (including gridding, grouping, zooming, layering, and alignment features), it "offers a fundamental-



Kevin Steele, Ray Ryan, Roger Rosner, Rob Kedoin, Alan Chung, Jonathan Schwartz of Lighthouse Design decided to risk their fortunes before they had anything to lose.

Different Strokes

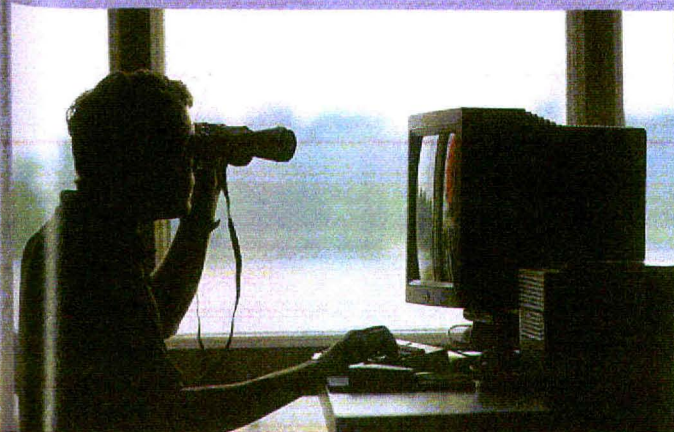
Stroke, stroke, stroke." The traditional call of the coxswain punctuates the chill morning air at a sculling regatta in Princeton, New Jersey. Far less traditional, though, is the NeXT computer set up on the riverbank to manage the heats and record the competitors' times.

But the NeXT system may help the United States Rowing Association (USRA) National Team boost its performance in next year's Olympics, says Geoffrey Knauth, a cox himself and a member of the

Boston Computer Society NeXT Group.

"I'm used to taking abuse from coaches and athletes whenever I use computers to process results at athletic events," says Knauth. "But it didn't happen this time. Usually the computer program takes too long, getting the information to the coaches too late to help them decide which rowers belong in which categories." The NeXT's real-time multitasking, coupled with the flexibility of Lotus Improv, solved the problem.

Geoffrey Knauth monitors U.S. rowing team time trials in real time from a NeXT.



full time, as in 24 hours a day."

After a few false starts on a CAD product, the team finally found their stride and market with the development of Diagram! -

ly different way of looking at productivity and presentation," according to Schwartz. Drawing innovations include customizable symbol palettes and direct manipulation of graphics in any view or magnification.

Diagram! also provides intelligent drawing in the form of rubber-banding (on-screen lines →

Knauth's system got its first trial at the National Team's scrimmages in Princeton last April. Knauth set up his computer on the riverbank in Mercer County State Park and in 15 minutes developed his Improv model for processing the competitors' times. His spreadsheet accounted for the entrant's name, rowing class, heat and lane number, race distance, times, and finishing position.

Now the USRA is evaluating the NeXT for use in all future events, including more advanced applications. Before each race, Knauth uses the NeXT to help prepare himself and his team. The "stroke" call must be precise. Since races of more than a mile are often decided by a boat length or less, the precise cadences used during the race are critical. Tools developed with the

NeXT's Sound and Music Kits help racers visualize the race's speed, rhythm, milestones, and tactical moves.

In the future, Knauth hopes to use a NeXTdimension for detailed video analysis and catalogs of individual rowers' techniques. How much this contributes to the success of the team will become clear at the Olympics next summer in Barcelona, Spain. ☼

by DAN LAVIN

→ Living Color

can represent connections and relationships to be retained when an object is moved or to be remembered when an item is deleted), smart labels that also move with their links, and Undo for the last change made to every object, not just a single one.

The reaction to their product, which shipped in January, has been very satisfying, says Schwartz. "When we demonstrate it, people usually buy a copy for every machine they own."

In contrast to the current trend by large developers of porting their software to several platforms, Schwartz said that his collaborators wanted to develop a product "to engage the NeXT, to take advantage of its unique features in ways that couldn't be implemented on other machines."

Lighthouse created a hierarchy of responsibilities to meet this development challenge, after first experimenting with other styles. "Consensus is a nice idea, but leads to 17-hour meetings," explained Schwartz. "Democracy is nice, too, but leads to 10-hour meetings. We needed some sense of organization. We held the naive assumption that if there was work to do, someone would pick it up and it would get done."

Now, team members rotate through various roles, assuming responsibility for specific portions of their business and engineering activities. While other developers they know have taken up to three years to begin beta testing, Lighthouse members report developing Diagram! in nine months, in what they call their "just-in-time" management style.

"It's going orders of magnitude more smoothly than before," said Schwartz. "There are way fewer fires to put out now." ■

by STUART SILVERSTONE

Mach's Main Man

When NeXT picked the Mach operating system he had helped develop at Carnegie Mellon University (CMU), Avie Tevanian wasn't ready to let it go.

"I figured there was this potential for a big downside," recalls Tevanian. "I was afraid that they were going to take it, misunderstand it, ruin it, and ship it," he remembers.

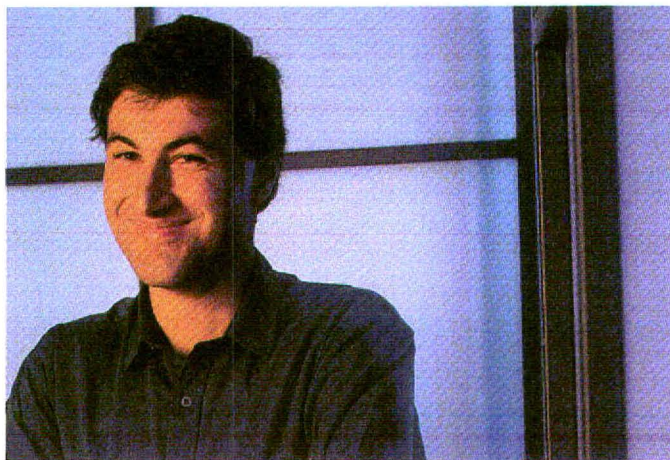
For the previous three years, Mach, a variant of the UNIX operating system, had been Tevanian's life. Originally called SOS, the Supercomputer Operating System, it was created for use in a secret multiprocessor supercomputer under development by Digital Equipment Corporation. The operating system was designed to coordinate the entire computer's activities, allowing different programs running on different parts of the supercomputer to communicate with one another rapidly and efficiently.

Although Digital eventually canceled the supercomputer project, the CMU group kept working. Its operating system seemed to mesh perfectly with the new generation of high-powered workstations that were just beginning to hit the market in the mid-1980s.

Steve Jobs discovered Mach in the fall of 1985. NeXT's founders were visiting universities around the country, looking for interesting technology. "They knew that UNIX was important to have," remembers Tevanian. Mach was

UNIX – and more. "It was more future-thinking. It was designed with goals that were similar to NeXT's goals: networked workstations, as opposed to a monolithic time-sharing environment."

A year later, while at dinner with Tevanian and Tevanian's CMU doctoral advisor, Rick Rashid, Jobs told them that NeXT had decided to use Mach. "We're



Avie Tevanian helped create Mach at CMU, now manages it at NeXT.

betting our company on you guys," Tevanian recalls him saying.

Jobs hoped Mach would be a magnet for NeXT. Says Tevanian, "They thought that bringing interesting technology into NeXT was a good way to bring good people into NeXT. Nobody wants to do a [UNIX] System V port."

Well, it brought in Avie, as he likes to be called. After receiving his doctorate from Carnegie Mellon, he took the job at NeXT as the company's director of system software.

When Tevanian arrived in California, things were off to an uneven start. "They had early prototypes that only half worked," he recalls. Some of the computers wouldn't even boot. On the other hand, John Seamons and Mike Demoney had already ported the

Mach operating system to the new computer. Tevanian set about fixing the bugs that were still in the Mach kernel, tuning Mach to the NeXT hardware, and planning the direction in which the operating system needed to grow.

Tevanian's office, on the second floor of NeXT's secretive Building Two, is a crowded testimony to his four years at NeXT. The shelves are overflowing with technical proceedings from Usenix conferences, NeXT documentation, books that

people have given him (and that he hasn't had time to read), and folders too important to file. In a corner of the office, in its original plastic cover, is his computer science doctorate from CMU.

These days, Tevanian supervises a staff of 15 people who work on the Mach kernel, as

well as all aspects of NeXT networking, connectivity, system administration tools, and multiple-file system support. Tevanian decides which features from CMU get put into the NeXT kernel – and which will be held until they have a better or more stable implementation.

Has Tevanian ever looked back? Well, his other job offer when he graduated from CMU was to work at Microsoft Corporation on OS/2. He admits that once in awhile he has a twinge of regret when he looks at the *Wall Street Journal* and computes the value of the stock options that Bill Gates had promised him. ■

by SIMSON L. GARTINKEL

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Rumors fly

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Field Reports

Hot topics and goings-on in the NeXT user community

Threads from the Net

Reading the news. NeXT developer Glenn Reid began what is certainly the longest thread in comp.sys.next history. It included a long string of characters that could be interpreted by a new NeXTmail-like NewsGazer as an image. The excited discussion of on-line multimedia news quickly mushroomed into a debate about multimedia standards and historical precursors. Then it degenerated into flames about large message attachments and appropriate net etiquette. One exciting scheme mentioned, the Profile Design Project, is a non-profit, long-term project to produce, distribute widely, and study the uses of a sophisticated multimedia on-line magazine that could potentially be read by millions.

ND limitation. Some new NeXT-dimension owners were disappointed that the on-board i860 graphics processor is accessible only through PostScript. They noted that NeXT's quoted 3-D graphics benchmarks are meaningless with this limitation. Are real-time video and interactive RenderMan only a dream?

Rumors fly. Readers wondered if there was substance to rumors of a NeXT 88100-based system, capable of 40 to 50 MIPS. Using this chip, coupled with the new, faster DSP 96002, NeXT-dimension performance would almost

double. Some posters affirmed the story, citing unnamed sources at NeXT. Others chimed in with additional rumors of NeXT's running on MIPS chips and of NeXT-step running on HP workstations.

Sez who? A spirited discussion raged for a short time after a prankster uploaded a fake *Wall Street Journal* article reporting that Sun and NeXT had allied forces to combat Apple-IBM and ACE. Supposedly, the two companies were to work together on object-oriented programming and RISC design. Sony was also said to be in on the alliance. Until the joke was exposed, readers hotly debated the merits of such a deal.

Giga appetites. Users' voracious appetites for mass storage were reflected in active discussions of experiences with gigabyte disk drives and more-exotic storage options. Sony's new optical for reading and writing inexpensive 128MB media with a 40ms access time for less than \$1000 was hotly anticipated. A poster noted that thanks to 20MB floppies, possible CD-ROM distribution of future NeXT system releases, and cheap high-capacity hard disks, multimedia on the NeXT may at last take off. There's a lot to fill up all that mass storage: The NeXT archives have more than doubled in size since *NeXTWORLD*'s last issue and now include new applications, pictures of net personalities, demos, games, sounds, and music.

Grass roots. A campaign was launched to convince Quark to finish the NeXT port of its admired layout program, XPress. The idea is to sign up enough guaranteed buyers to cover Quark's remaining development

costs. To add your voice, write to Tim Gill at Quark, 300 S. Jackson St., Denver CO 80209. Similarly, Dan Goldman of Digitalk says he will port SmallTalk to the NeXT if he hears from enough potential buyers. Call him at 213/645-1082 or write Digitalk, 9841 Airport Blvd., Los Angeles, CA 90045.

Stats I. Postings to comp.sys.next continue to rise. By midyear, the group was the 18th most read out of 1400 news groups, had captured 4 percent of all netnews readers (a total of 40,000), and was transferring a whopping 3.7MB of news per month. Bursting at the seams, the group voted by a 7-to-1 margin for splitting into several subgroups: comp.sys.next.announce, a moderated list for the most-important announcements, events, user group meetings, and public-service postings; comp.sys.next.programmer, for programming questions, tips, and techniques; comp.sys.next.sys.admin, for help setting up, running, and enhancing NeXTs and their networks; and comp.sys.next.misc (about half of total postings), for all other postings. International postings are growing, including some that suggest that the technical and economic transition to internationalization has not always been smooth.

User Group News

New services. The San Diego and Denver groups have added bulletin boards; Dallas and Houston have launched newsletters. Several groups including Boston last spring and Denver last summer, have even sponsored full developer camps. A full developer camp includes massive preparation, including amassing lots of NeXTs in a room, finding paying customers, and convincing NeXT to

let lots of user group "assistants" come for free to "help."

NUJ gets new editor. The excellent BuZZNUG newsletter, *The NeXT Users Journal*, has a new editor. John Bennett has taken over from Erica Leibman. Great run Erica, and welcome John. NUJ is published over the Internet and is available free to all.

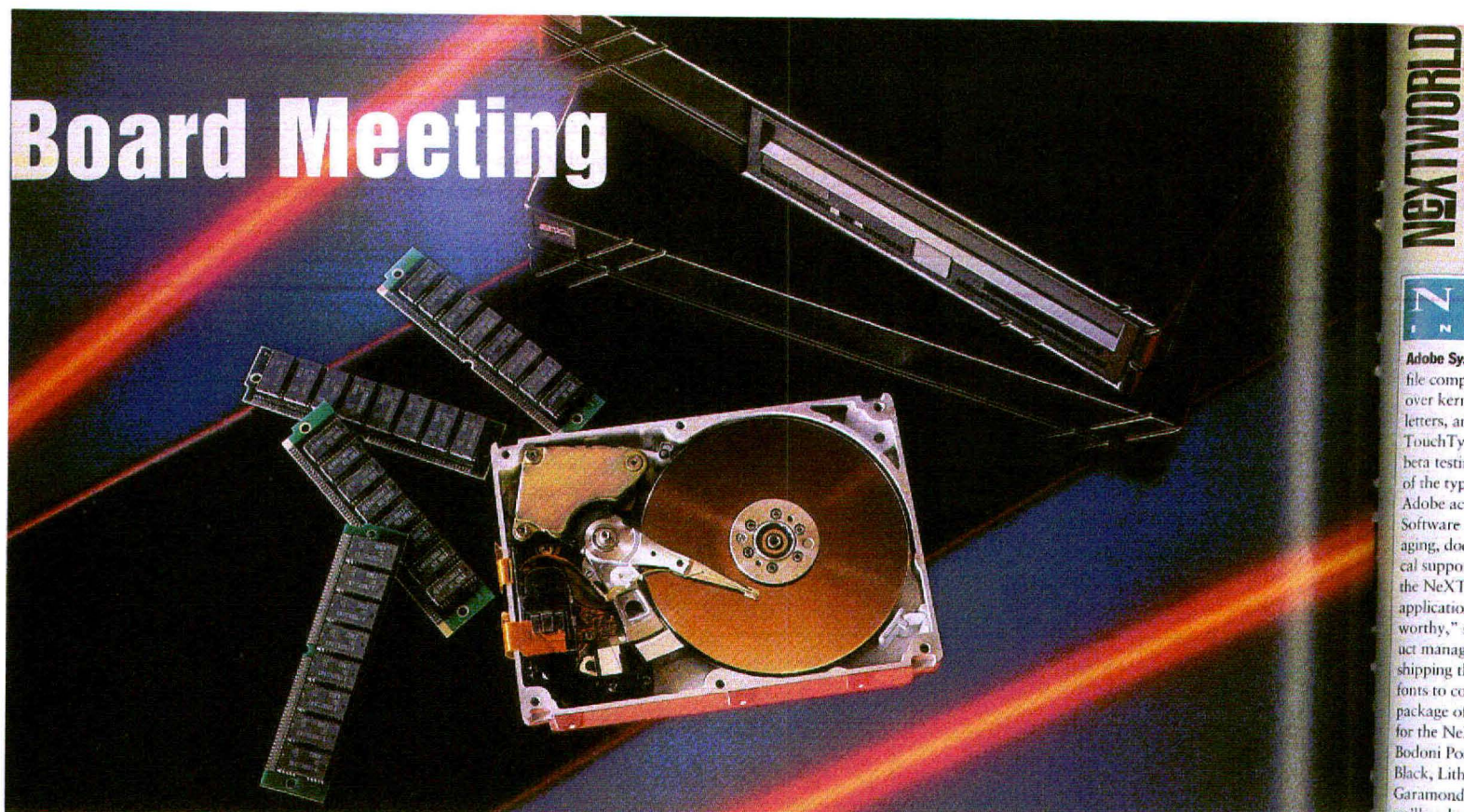
Adobe goes on tour. Adobe, taking on the trappings of a major rock group to promote Illustrator for the NeXT, has been on the road. Their '91 North American User Group Tour has included stops in Denver, Los Angeles, Boston, San Francisco, New York City, and Washington D.C. Groups have been wowed by Adobe's best-yet version of its illustration package.

New forum. CompuServe's NeXT forum is off to an active start. Moderated by Dave Bowdish and Young-Kyu Yoo, active threads include design ideas for a new cube and long discussions about optical drives versus CD-ROM. Threads focusing on the future of NeXT and the Apple-IBM agreement are popular as well. Participants engaged in a contest to predict NeXT's second-quarter financials. To join, type go nextforum at the CIS prompt. Bowdish's address is 76711,143.

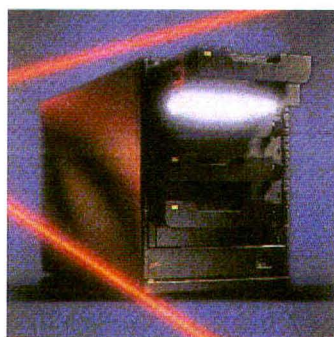
Stats II. With new groups formed in Switzerland and Taiwan, there are now 151 NeXT user groups in 40 states and 20 foreign countries. Total membership is pushing 10,000 worldwide.

by CHARLES L. PERKINS
AND DAN LAVIN

Board Meeting



If there is one thing that NeXT's professional workstations need, it is room for growth. And, there's only one economical solution for that... ETC's storage and memory products.



The ETC DataPort™ is an innovative melding of 3 1/2" Winchester drives with a removable cartridge assembly. This gives you up to 2.1 gigabytes of secure data storage with a flexibility you never imagined was possible—even on a NeXT computer.

Meet the new chairman of the board. ETC Peripherals has stepped forward to lead the revolution in upgrades for your NeXT™ computer. With more memory intensive products just around the corner, the need for an innovative and economical way to handle and store them has never been so great.

If flexibility, portability, security, speed or reliability are part or all of your problem, the ETC DataPort Family is your answer. It comes in an almost infinite number of configurations.

If you need a more "buttoned down" approach to your storage

problems, we make a full line of external disk drives. And with capacities ranging from 120MB to 1GB, there is certain to be one that fits within your budget.

Also, our ETC 88R employs a SyQuest™ removable media drive to deliver one of the most cost effective way to upgrade your NeXT computer.

So, let us help you plan your upgrade agenda. Call us at 800-882-2863 for more details.



ETC Peripherals, 5426 Beaumont Center Boulevard, Suite 300, Tampa, FL 33634, (800) 882-2863, (813) 884-2863, Fax: (813) 888-9535

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NEXTWORLD



Adobe Sys
file comp.
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beta testir
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Software :
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NEWS
IN BRIEF

Adobe Systems will add Illustrator file compatibility, greater control over kerning and baseline shift of letters, and new menus to TouchType in version 2.1, now in beta testing. The updated version of the type-manipulation package Adobe acquired from Right Brain Software also will get new packaging, documentation, and technical support. "We're committed to the NeXT and want to publish applications that we think are worthy," said Tim Myers, product manager. Adobe is also now shipping three sets of PostScript fonts to complement its original package of type styles available for the NeXT. Types include Bodoni Poster, Trajan, Cooper Black, Lithos Bold, and the Adobe Garamond family. "Eventually we'll make all our fonts compatible with the NeXT," a representative said.

Lighthouse Design recently shipped Void, a networked multiplayer video game for the NeXT. Void features stereo sound, color graphics, and near-3-D animation. Multiple users can play simultaneously across the network, communicating via "intercockpit messaging." The object of the game is to destroy opponents or opposing teams. It lists for \$149 for a three-player pack and is available through NeXT Connection and dealers. Lighthouse also began shipping Diagram! 1.1 in August. This interim release makes Diagram! files and files linked to them usable with Digital Librarian. Other changes include bug fixes and more sample files. Diagram! 1.1 costs \$399, the same as the previous version; upgrades are free. Lighthouse can be reached at 800/366-2279.

NeXT's third tech alert of 1991 relates to a potentially serious bug in NetInfo. Spurious directories can appear as a result of normal operations. When the directories are deleted, the NetInfo database may become corrupted. Network administrators can obtain the full tech alert from NeXT or any dealer. [SEE BRIEF, PAGE 18]

Chip choice
weighed for
new systems

by SIMSON L. GARFINKEL

Palo Alto, CA—In the wake of new industry alliances that alter the competitive lineup of advanced CPUs, NeXT is re-evaluating its decision to base its next-generation systems on the Motorola 88110 processor, according to sources.

NeXT had been expected to develop a new high-performance workstation for introduction in 1992 based on the 88000 chip family. The decision by Apple Computer to base its future systems on a new Motorola implementation of IBM's Power PC RISC technology has apparently caused NeXT to reconsider its own plans.

"Motorola's big potential customer was Apple. If all their hardware people are concentrating on the [Power PC] chip, it seems unlikely that they will spend much effort on the 88K," said David Henkel-Wallace, a founder of Cygnus Support, a Palo Alto company that supports compilers and advanced system [SEE CPU, PAGE 18]

Book 'em, Dano: NeXT gains sales
in station houses and trading floor

by DAN LAVIN

Redwood City, CA—NeXT continues to close major sales in its target markets with sales to the Toronto police and a Connecticut financial-services firm.

The trading company, which asked not to be named for competitive reasons, reportedly has committed to 500 NeXT machines and is taking delivery of the first 50. According to a manager at the company, the machines will be used in trading-floor and database applications.

NeXT beat strong competition from both Sun and Compaq to close the deal. The units, to be purchased directly from NeXT, were selected for their advantage in

DTP vacuum to be filled

by DARCY DINUCCI

San Jose, CA—While Quark has put plans to port its Macintosh page-layout leader XPress on the back burner, small developers are rushing in to fill the page-layout gap on the NeXT.

Pages Corporation, Right Brain Software, and Archetype are each developing full-featured page-layout programs that should be shipping by early next year. Right Brain and Pages will show early versions of their products at the Seybold Computer Publishing Conference here this month. At press time, it was not known whether Archetype would be ready to show its product at Seybold.

Other new products expected at the show include a presentation software package from Lighthouse Design of Chevy Chase, Maryland; an illustration package from Altsys of Plano, Texas; and a film recorder from Cube Technologies of Houston.

"The hope for NeXT is to attract all those crazies with neat ideas who want to leverage the platform and do things more effectively than they could some place else and who would get crushed in another marketplace," said Jonathan Seybold, publisher of Seybold Publications (see our Sey-

RACE FOR THE PUBLISHING MARKET		
PAGE LAYOUT	ILLUSTRATION	IMAGE PROCESSING
FrameMaker FrameTechnologies	Illustrator Adobe Systems	Artisan Media Logic
Eclipse* Right Brain Software	TopDraw 2.0 Media Logic	? Cube Technologies
? Archetype	Stealth* Alsys	Photoshop Adobe Systems
Bonzai, Hokusai* Pages Corp.		
■ released product		*Code name

bold interview, page 16).

"It doesn't take us the kind of capital investment that it takes large companies that are management-loaded," said Steve Sarich of Cube, which also has a photo retouching program under development.

Of the page-layout programs, Right Brain's product, code-named Eclipse, takes the most traditional approach. "Our goal was to take every feature and make it 10 to 20 percent better than it's been done before," said Glenn Reid, president of the Palo Alto, California, company. Reid said the program includes improvements in the usability of standard features such as selecting objects. It also will offer new features, such as the capability to shear objects.

"We're making it as blazingly fast as we possibly can. It will be 50 to 100 times faster than Illustrator in placing Encapsulated

PostScript files," Reid said.

Archetype's product will be built in user-extensible modules that take advantage of the NeXT's object-oriented programming environment, according to sources. The company, based in Waltham, Massachusetts, currently publishes an advertising page-makeup program for Windows, but the NeXT program will be a full-featured layout program, sources said.

The Pages product will be offered in two modules: one for end users and one for designers. "We're trying to address the concerns of people who spend a lot of time tweaking documents because they're not sure they look right," said Bruce Webster, president of the San Diego company. Webster said the product can be thought of as "a font editor for designs," which in-house or independent designers can use to create design modules for [SEE DTP TOOLS, PAGE 18]

NeXT prepares to ship GNU source code

by SIMSON L. GARFINKEL

Redwood City, CA—After dragging its feet for nearly a year, NeXT plans to release the source code to its Objective C compiler and debugger in October, according to Kevin Wells, software product manager.

The NeXT compiler and debugger are modified versions of the GNU C Compiler and GNU Debugger, written by the Free Software Foundation (FSF) of Cambridge, Massachusetts. Under the terms of its license agreement with

the FSF, NeXT must provide the source code for the compilers "without charge except for the cost of media, shipping, and handling."

But NeXT has failed to fill users' orders for the source code since the release of NeXTstep 2.0, according to users. "We take very seriously the requirement for all redistributors of our software to make source code available," said Richard M. Stallman, president of the FSF. "If [SEE COMPILERS, PAGE 18]

INTERVIEW

Jonathan Seybold: NeXT's big challenge is still software

On the eve of the Seybold show, NeXTWORLD editors Dan Ruby and Darcy DiNucci visited Jonathan Seybold at his Malibu, California, offices for an in-depth interview about NeXT's prospects in the desktop publishing market.

NW: What are main benefits of the NeXT for publishing? What are the main drawbacks?

JS: Take Illustrator, for example. The biggest advantage is that you can work directly in Display PostScript. On the Mac, because it's a QuickDraw machine, you end up working in an outline form and then saying, "Okay, go and render this for me," and sit there and wait for it to render it for you. On the NeXT machine, you're working directly with Display PostScript. It makes it a much more potent program.

The main problem is software. In the publishing market place, what NeXT needs is QuarkXPress or its equivalent.

NW: Why specifically QuarkXPress?

JS: Well, I'd settle for PageMaker, too. But, basically, those are the two leading page-layout programs.

The kinds of things that NeXT could really capitalize on would be doing the stuff that the Mac is running out of power for – the high-end graphics stuff. [NeXT] really would have the advantage. Particularly with all the color stuff, you can imagine what NeXT could offer. But to do that, you need a really good page-layout program.

NW: What about Pages?

JS: Pages is a very interesting development. Pages was conceived as being for the mass office marketplace. But the magazine people looked at it and said, "Gee, there are some neat some things here."

It reinforces an argument I've been making for a long time. I have never believed that there is a fundamental difference between the publishing marketplace and the office marketplace.

With old technology, you were forced into a choice. If you wanted to produce a document, you could do it yourself in your office, where it was inexpensive and you had control and fast turnaround. It was typed and printed, and it looked lousy. Or, you could go outside to a craft – people using craft equipment – and it would take much longer, cost much more, you'd lose control over it, you'd go back and forth because they'd make a mistake and you'd have to correct the mistake, and so forth. You'd have a much more effective document. But you would only do that with documents that were important enough to warrant the pain and cost of doing that.

Now we've removed that barrier, and what we're seeing is, lo and behold, all along there weren't two classes of documents. The publishing people are just at the leading edge; they run into the walls first. And if they run into problems, they don't get tangled up in them; they're sophisticated enough that they can work their way out of them. If you don't solve the problems for them and you let the office guy run into the same problems, you'll be through. Pages is a good example of that. Here's a product that was intended for the naive user, but the first acceptance of this, as often happens, is from sophisticated users who understand what it does and what its potential is.

NW: So for the NeXT in the publishing area, the current glaring holes are in page makeup and image processing?

JS: Yes. And what NeXT can add is that the page-makeup stuff can be customizable.

The software that's available in the mass market doesn't really address all of what any particular person does, so we shouldn't be surprised that we haven't gotten the productivity gains that we thought we were going to get. You need to build things that are much more focused on an industry or an application or an organization, and leverage what the people doing those tasks really do.

Now that's too specific to support mass-market application software. It's the same thing

we were doing back in the 1970s with custom application programs. The only way I can think we're going to get to this area is through what we around here call "Lego software," software modules that can be plugged together to meet the needs of a larger application. You select modules, you link them together, and you may very well add some value of your own.

Now you really need an object-oriented environment to do this. That is how you could really leverage the NeXT environment, to be fundamentally different from things that exist elsewhere.

NW: The kinds of things that people use QuarkXTensions for?

JS: Right. One example is the system that *Time* magazine has been playing with and is marketing. They've written a whole bunch of software for editing copy, and they've written a QuarkXTension that basically places the copy automatically onto a page. The thing looks like a seamless whole rather than a bunch of individual programs.

NW: And that's the direction that something on the NeXT should go?

JS: Yes. In a much more open fashion. And that's the sort of thing that can make a fundamental difference. It could be a whole different metaphor of how one builds application solutions. It's important to publishing, but I think it's also important as a metaphor to be emulated for other kinds of software.

NW: What about color prepress? Some developers seem very excited about the platform, saying that the NeXT has the color and the performance that would allow you to do the kind of thing you could do on a Scitex.

JS: It is a natural platform. But ever since three weeks before the announcement of NeXTDimension and the NeXTstation Color, we've had conversations with companies – good-sized companies – who really wanted to develop color software for the machine. And so far all the smaller companies are doing things, and the bigger guys have backed off. The bigger guys haven't had the nerve to commit to NeXT and NeXTstep.

NW: So who's going to do this kind of software?

JS: The hope for companies like NeXT is to attract all those crazies with neat ideas who want to leverage their platform and do things more easily and more effectively than they could somewhere else and who would get crushed in some other marketplace.

NW: And those applications will lure people to the platform?

JS: You could argue that if NeXT continues on the ramp it is on, it will be an incremental haul, but it will be sufficient by itself to get one software developer, two software developers, and to gradually build up steam.

But I believe that if NeXT is going to be a major force in the marketplace, it's going to have to be a system software

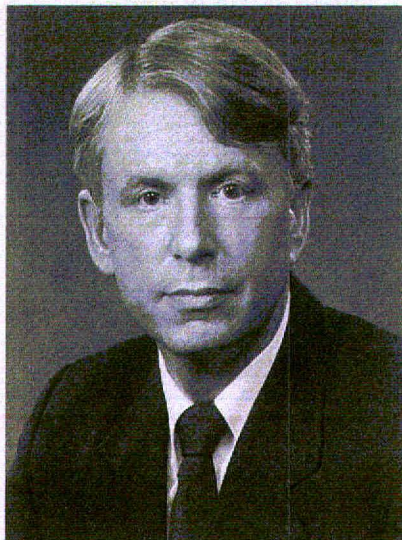
company. That doesn't mean it can't be a hardware company. In fact, I would argue that if you had great system software and you had the neatest hardware – hardware that was tailored to that system software – that gives you a major advantage in selling the hardware as well. But I just don't see how any individual player starting where NeXT is starting from can get to a significant critical mass by itself, to really attract the numbers of third-party software developers you have to attract to be a major contender in the marketplace.

NW: And when NeXT has the software...

JS: If sufficient software were available, I think that the market would be immensely receptive to NeXT. Nobody could have gone to our conference last year and not been impressed with the level of attention that NeXT got. An independent survey of show attendees found that NeXT was the second-most remembered exhibit after Adobe and that it ranked first for the most impressive demonstration and presentation at the show. And the major reason for remembering an exhibit was interest in products. This was last year, when NeXT was showing the NeXTstation and color.

NW: So people are interested.

JS: Absolutely. If you look at what NeXT is doing from a system software and hardware standpoint, it's mostly the right stuff. I've been on them since '88 about connectivity with PCs and Macs, and NeXT's finally taking some shape there. You can point to areas where there needs to be some improvement, but by and large the challenge remains software. The challenge remains to get the neat software, enough software so that people can do their jobs better.



"If NeXT is going to be a major force in the marketplace, it's going to have to be a system software company."

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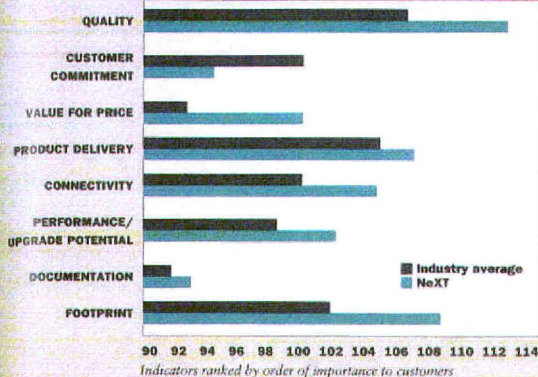
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HIGH GRADES FOR NeXT
The Dataquest Satisfaction Index

Survey finds satisfied users

by SIMSON L. GARFINKEL

San Jose, CA - NeXT users love their computer's quality and value but question the manufacturer's commitment to its customers, according to a recent survey conducted by Dataquest, a leading market research firm based here.

In the survey, the first of its kind in the workstation marketplace, Dataquest interviewed 1000 users of workstations across the United States to find out what they liked and disliked about the machines they are using. Overall, NeXT ranked second in the industry in customer satisfaction, behind Silicon Graphics, but ahead of Sun Microsystems, IBM, Hewlett-Packard, and other manufacturers.

The survey ranked customer

satisfaction in eight key areas: hardware and operating system quality, product delivery, footprint, connectivity, commitment to the customer, performance and upgrade potential, value for the price of the workstation, and documentation. NeXT performed better than the industry average in every category except "commitment to customers," the category ranked second in importance by users, according to Steve Goetz, Dataquest's vice president of marketing communications. In that category, Dataquest found NeXT to be significantly below the industry average.

"We are taking the feedback [about customer commitment] very seriously," said Elton Sotello, NeXT's manager of customer support. "We are taking a look at some of our support policies, in particular the way we handle problems and complaints that come in through the 800 number."

About 75 NeXT customers were interviewed for the survey. Dataquest plans to repeat the survey every quarter.

OVERALL CUSTOMER SATISFACTION

- 1 Silicon Graphics
- 2 NeXT
- 3 DEC
- 4 Solbourne
- 5 HP
- 6 IBM

Partnership programs consolidated

by DAN LAVIN

Redwood City, CA - With the promotion of Max Henry to vice president and general manager for Pacific operations, NeXT's developer partnership group was consolidated last month as part of the company's marketing department. Donna Simonides was named to head the new group as director of developer relations.

Now all three segments of NeXT's product marketing strategy - hardware, software, and third-party - will coordinate even

more closely, Simonides said.

The developer partnership group manages relations with independent software vendors and other third parties. Chris MacAskill has been named to replace Simonides as the manager of the developer advocate group. The advocates serve as a liaison between developers and NeXT.

Vendors seeking information about NeXT's registered developer program should call 800/848-6398.

VCs back NeXT projects

by DAN LAVIN

Redwood City, CA - In an increasingly tight market for venture capital, at least two firms developing NeXT-specific software successfully attracted initial funding last month.

Pages of San Diego will be using the venture funding to develop an advanced desktop publishing system. The package will run initially on the NeXT but will soon be ported to other platforms, said Robert F. Kibble, a general partner of Paragon Venture Partners, based in Menlo Park, California, which contracted to invest \$2.5 million in the company.

"Our goal is to get to cash flow break-even on NeXT and choose a follow-up platform. The advantage of NeXT is that it will show [the product] very well and get a lot of people to want the product on another platform. This is a cheap proof of concept and avoids an expensive launch on other platforms," said Kibble.

The second company, unnamed at press time, will publish WriteNow and other programs (see NeXT Ink in this issue and NEXTWORLD Extra, September 1991). At press time, the president of the new company, Randy Adams, had not yet disclosed the amount or source of his venture funding, but said that the investment was wholly independent of NeXT.

According to a venture capitalist at one firm that was approached by the new company but that declined to participate in the deal, the new company was seeking up to \$5 million in capital. He said top NeXT executives were involved in the funding proposal.

"NeXT was going to jump start the company by helping to provide software packages, special support, and special access," he said.

Venture funding often provides the means for a small company to bring a product to market. In return, the venture capitalists usually receive a significant share of equity in the company.

Trying to attract funding for these new companies brought a new factor into the traditional venture-capital equation: the health, and prospects for success, of NeXT itself.

"As part of our due diligence we had to investigate the chances of NeXT itself. We visited the factory and met with Steve [Jobs] directly several times,"

said Kibble, who finally concluded that the NeXT's technical sophistication is one of the "best-kept secrets" of the computer industry.

The fast development cycle on the NeXT platform was sure to save money for the firm, said Kibble. Paragon estimates that NeXT will have an installed base of 225,000 machines by the end of 1993, with Pages's product holding

a 20 to 25 percent market share.

But other venture capitalists who were approached to fund Pages were less impressed by NeXT's technology and installed base. "The number of [NeXT users] is pretty low right now. We like an opportunity to sell to millions of people," said Tench Cox, general director of Sutter Hill Ventures of Palo Alto, California.

NeXT Ink

by DAN LAVIN

The spinners

Spin control. The recent formation of a new software company, unnamed at this writing, to publish WriteNow and possibly other unbundled NeXT software, as well as software from other developers, raises some interesting questions.

The first issue to get out of the way is NeXT's interest in the venture. The mother company is doing a lot of hand-wringing to avoid any mention of the C word (Claris, that is). There is a key difference: Unlike Claris, Apple's software subsidiary, which is wholly owned by Apple, NeXT has no financial interest in the company.

But there are also similarities. The company involves former NeXT employees and has a clearly preferential relationship, regardless of NeXT's protestations to the contrary. It is not as if the WriteNow account went out for open bid.

Ultimately, it does not really matter what the stock certificates read. It matters what the company will do. I am more than willing to believe that the company will operate as an independent software company, and I think that NeXT will be highly scrupulous about the relationship, but I also think that a taint will always exist. Non-favored software developers are certain to complain about unfair competition.

Spin cycle. Despite all that, the company will clearly be a positive force in the NeXT community. First, it is going to commercialize WriteNow, which will make for real competition in the word-processing category while also establishing a level playing field for the competitors. Sentimentally, I might mourn the passing of free WriteNow, but it is more important that there are multiple commercial products in major software categories.

The company also will be a good thing for the community if it brings some of NeXT's internal applications to market. NeXT has some fantastic applications that it uses to run the company and create the product. The only thing standing in the way of the rest of us using these products has been the enormous expenditure of resource needed to commercialize them. An outside company will be able to move far more nimbly than NeXT ever could.

The company says it also intends to publish the work of small developers. The community has a lot of small guys creating great software, but they lack the resources to market, manufacture, and sell commercial products. Since the NeXT market seems risky to the outside world, these developers might have trouble getting represented by a traditional software publisher. With the new company's special relationship to NeXT, programs that are needed by the community but not necessarily commercial gangbusters have a chance to reach the market.

Finally, it will also write software of its own, focusing on major productivity software categories, where NeXT clearly needs more support. However, there may be a problem in this area.

Spin down. The new company is driven by devotion to a platform, not a set of customer problems. It will tend to select problems to solve based on holes in the market, not out of enthusiasm for a particular product. This has proven to be an unsuccessful tack in the past and is exactly why Claris has failed to dominate its market.

According to Jeff Tatar, publisher of *SoftLetter*, "The secret to building successful software companies is passion for products or problems, not passion for platforms. Real software entrepreneurs start by having insights into real customer problems. They don't start companies to exploit markets."

To sidestep this problem, I suggest that the new company avoid the mainstream applications. Instead, it should focus on encouraging small developers and publishing the applications streaming out of NeXT. As for internal development, what it should do is hire people with dreams, empower them, and let them run with them.

See, a whole column without saying spin-off! NeXT should be happy.

BRIEFS
Continued

Ingres Division of ASK Computers has dropped the NeXT from its list of supported platforms by nixing plans to offer the latest release of its relational database on the NeXT. "We have no plans to abandon that particular platform, but we don't know when and if we'll be putting 6.0 to the NeXT," said Glynnis Sears, an Ingres spokeswoman. This policy could leave some users orphaned, especially if the current version isn't compatible with the forthcoming NeXTstep 3.0. NeXT and Ingres are still talking, however, according to Margaret Chan, NeXT database advocate. "The excitement around DBKit [being released] in the near future could get them to port at least part of their product," she said.

Metaresearch has unbundled its popular SoundWorks program from its Digital Ears digitizer, for people who want to edit sounds but are satisfied with the quality offered by analog microphones and the NeXT microphone port. The unbundled SoundWorks version 2.0 costs \$395. Digital Ears alone lists for \$595. A bundle of the two is \$795. SoundWorks allows users to cut, copy, and paste digitized sounds, as well as to control echo, reverb, and filtering. Metaresearch can be reached at 503/238-5728.

Wolfram Research recently released Mathematica 2.0 for the NeXT. Mathematica 1.0 or 1.2 users will be upgraded for free. Higher-education users will receive 2.0 bundled with new machines at no extra cost; for other users the program costs \$1495. The documentation is an additional \$75. Wolfram Research can be reached at 207/398-0700.

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Editorial Director: Dan Ruby;
Manager: Darcy DiNucci; News Editor:
Dan Lavin; Staff Writer: Simson L.
Garfinkel; Copy and Layout Chief:
Sae Troy

CPU [CONTINUED FROM PAGE 15]
software on a wide variety of UNIX platforms.

"Even though the 88K is a perfectly fine chip, the stigma of rejection is now associated with it," said Michael Slater, editor and publisher of *Microprocessor Report*, an industry newsletter. "It is not going to have a lot of support from major computer companies, and it is going to be a sort of an oddball architecture."

Current customers for the 88000 family include Data General and Unisys. In June, Motorola announced that a special version of the chip will be used for microcontrollers in Ford Motor Company automobile engines.

Following the Apple-IBM announcement in July, Murray Goldman, general manager of Motorola's Microprocessor and

Memory Technologies Group, made a statement underscoring "Motorola's commitment to supporting the system vendors and their customers who have chosen the 88000 RISC MPU family."

"Certainly, Motorola remains committed at least to the 88110," Slater said. "The whole thing is very much in flux, and everyone is trying to figure out what they are going to do."

Despite the 88000 family's liabilities, NeXT would retain at least one distinct advantage by staying with that chip family. With the close working relationship between the two companies, Motorola can add special features to the line that will serve NeXT's needs better. For example, the 88110 chip has special instructions to ease graphics operations and improve the performance of Dis-

play PostScript. It is possible that special, undocumented instructions might be available in the version of the chip provided to NeXT—but not to other companies.

While the 88110 would provide high performance, it may be limited in its range of available options. Although there are many versions of the SPARC and Intel 80386/80486 chips available, Motorola's 88100 comes in just four, with clock speeds of 16, 20, 25 and 33MHz, and initially the 88110 will be available at only one speed.

Other CPU candidates for future NeXT systems include SPARC, Intel, and MIPS microprocessors. Any of these choices would permit NeXT to bring new systems to market in 1992.

NeXT might also choose to wait for Motorola's 68050 chip,

which would give the NeXT station and NeXTcube improved performance without sacrificing object code compatibility with existing programs. However, Motorola is still not shipping the 25MHz version of the 68040 in quantity, and the 68050 chip is thought to be a long way off.

NeXT could also follow Apple and go with Motorola's Power PC. But that would entail an even longer wait. "The original 88K was about two years late. It should have been out in 1987, but wasn't available until 1989," said Michael Tiemann, Cygnus's president and author of the NeXT's C++ compiler. Tiemann expects that Motorola will have similar problems getting the Power PC chip out the door.

NeXT declined to comment on future systems. ☛

DTP tools [CONTINUED FROM PAGE 15]
use with the end-user program.

Media Logic of Pacific Palisades will show upgraded products at Seybold. TopDraw 2.0 includes a revised user interface and presentation tools for automatic wipes and dissolves in slide shows. Artisan 3.0 is a full-color

image retouching application that the company expects to release by year's end.

One prominent no-show is Adobe Systems' Photoshop, a part of the company's Macintosh image processing program, which is not expected for NeXT until late 1992. ☛

Compilers [CONTINUED FROM PAGE 15]
users don't get source code, they don't have the freedom that we are working to bring them."

Wells said that a variety of technical difficulties kept cropping up in getting out the source code.

"As far as I can tell, NeXT has had distribution problems with the

GNU software no worse than the rest of its product line," said David V. Henkel-Wallace, director of support at Cygnus Support, which supports the GNU compilers. "I know there is a definite commitment among the technical folks, and supposedly from Steve Jobs, to honor the GNU Public License." ☛

Sullivan bound for San Jose despite Agency cuts

Precision measurements are more a way of life at the Agency than on Chesapeake Drive, but lately Lt. Sullivan has been brewing coffee the NeXT way, measuring precisely 2.5 scoops of French Roast into the industrial machine at the office coffee station. He listened to the usual morning gossip from the crowd of sleepy office workers and then shuffled back to his cubicle to start his daily on-line ritual.

At the familiar CompuServe prompt, he entered "GO NEXT" to gratify his latest obsession—the fast-developing NeXT Forum. This is especially good for gathering information from the international community, as much of the world seems to have access. Another active watering hole is America Online, but since SoftPC can't handle DTR handshaking on the NeXT, it is not able to help out the growing number of NeXT users interested in logging onto AOL.

Thinking of SoftPC, Sullivan checked his file on the upgrade that agents say will run Windows better than any Windows machine. That will come in handy in the DOS-infected districts of the building, he thought, but users won't get their hands on it until early next year.

Meanwhile, MicroPhone II has experienced more delays than Lotus experienced bringing 1-2-3 to the Macintosh. It still isn't shipping, Sullivan noted ruefully. If the same malady doesn't strike Thoughtful Software, HyperCube could be ready by the end of the calendar year. Another development cycle nearing the finish line is the long-announced CD-ROM: Sex, Lies, & CD-ROM from Bay Area NeXT Group. It is the first exclusively NeXT CD to be made generally available.

Reviewing his calendar, Sullivan considered canceling his swing to San Jose for the Seybold show. With the Agency's travel budget soaring since late August, expenses are under heavy scrutiny these days. Why blow a trip when NeXT has shelved hopes of making a big splash with its Canon color printer? The holdup seems to be PostScript Level 2 implementation, which is now delayed until the release of System 3.0. On the plus side, NeXT's publishing advocates seem to have won their arguments with some favored developers to go public with early looks at page layout, image processing, and animation software. Many of them were leery of getting tagged as vapor products. Tipping the scales was the appearance the magazine was expecting him to make, so Sullivan reconciled himself to October in San Jose.

Meanwhile, back in Redwood City, attention has turned to the question of

bundled software. Besides publishing WriteNow, the contract with NeXT gives Randy Adams's new company non-exclusive rights to one or more pieces of NeXT's formerly bundled software. Speculation is centering around demo applications such as Icon and Draw. The code for Icon is, of course, a mess, but Keith Orlitz's totally rewritten version, Pixelist, would make a nice commercial photo retouching product.

Then there is NeXTstep 3.0. One of the new features quickening pulses in Redwood City is a possible license of the Pantone Color Matching System for inclusion in the color picker. With a general license, individual developers would be freed from the need to individually license PMS for their application, lowering their software manufacturing costs significantly.

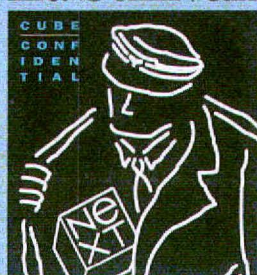
After intense lobbying from third-party developers and graphic artists, it looks like NeXT is finally scheduled to update the digitizing-tablet drivers in 3.0 to support the pressure-sensitivity features of the Wacom tablets. On the already announced AppleTalk networking support, there is some question whether it will include printer-access protocols (PAP) for easy printing from NeXT workstations to high-end PostScript imagesetters like the Linotype Linotronic L330, Agfa SelectSet 5000, and Scitex PS Dolev.

Can you say "conflict of interest"? The parent company that publishes this magazine has just moved its San Jose, *SunWorld*, into the same division, Integrated Media, that houses sister publications *Publish* and *NeXTWORLD*. In a new twist, the two rival platforms' publications will be sharing one set of offices in San Francisco, to the chagrin of both sides.

[Editor's Note: Okay, Sully, I guess that's the reward I get for giving you carte blanche. Our agreement is that I don't cut your items, but who says I have to sit here and be quiet? Yes, *SunWorld* is moving into our building, which also includes prominent publications covering the PC and Macintosh. No, we won't share information or pursue common strategies.]

With world vodka supplies in question, we must learn new ways to entertain ourselves. Interesting information makes the world more fun. NeXTWORLD T-shirts make your wardrobe much nicer as well. E-mail Lt. Sullivan@nextworld.com or call his voicemail at 415/978-3374. But don't call the Agency. They might start examining his expense reports.

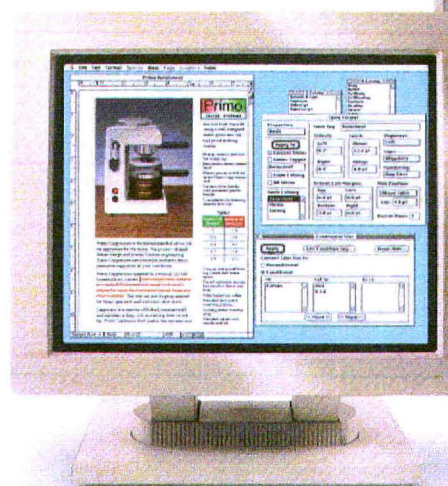
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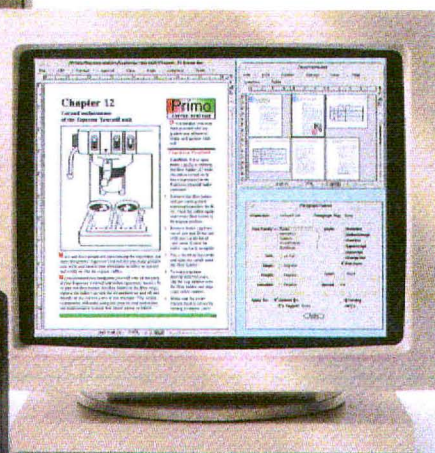
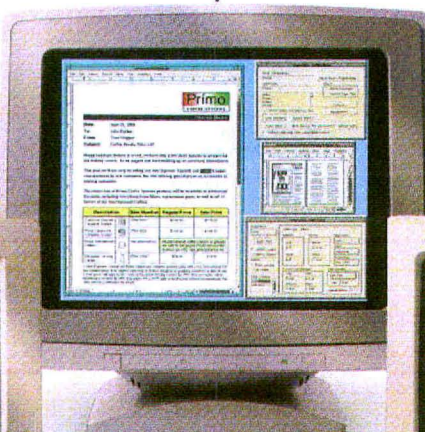
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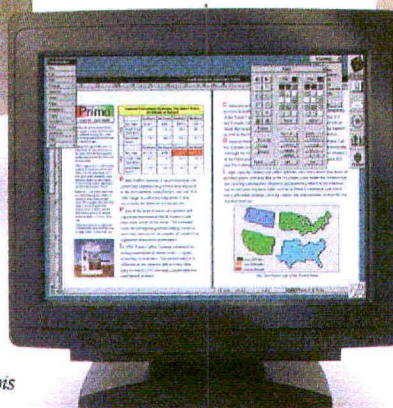
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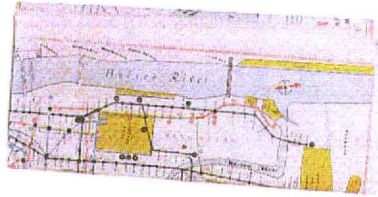


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TRAVEL GUIDE TON

Nothing inspires anxiety as much as the unknown. For travelers, it might be arriving at night in a strange city. For NeXT users, it is dealing with the complexities of computer networking.



As with traveling, there are two ways to approach networking. There are the packaged tours: the out-of-the-box proprietary solutions, exemplified by Novell's popular NetWare for PCs, and open-systems networking, which allows you to plan your own itinerary.

Whichever approach you take, you'll find that a NeXT is an excellent traveling companion. From the start, NeXT has supported open-systems standards such as Ethernet and TCP/IP and has tamed UNIX system administration with Net-Info's point-and-click network management.



NeXT to Bridge the Great Divide

The undisputed king of file sharing in the DOS world is Novell's NetWare. The Utah-based company's de facto standard network file system runs on so many computer systems that the company has lost track of how many, although it knows that the number of NetWare nodes is more than a million. Novell ships 20,000 copies each month, according to a company spokesperson.

Although NetWare is available for the Macintosh, most of Apple's network users run AppleShare, the network file system built into the Macintosh operating system. Meanwhile, most UNIX computers use NFS (Network File System) developed by Sun Microsystems.

All of these systems provide different ways for doing basically the same thing: moving information over an Ethernet so that files stored on one com-

puter's hard drive (client). Unfortunately, for NeXT Deep in

ONeXT NETWORKING

Now NeXT has announced that it will soon directly support Novell and Macintosh networks in an upcoming NeXT operating system release. NeXTs will plug into NetWare or AppleShare networks and go to work, seamlessly and transparently.

All this may change popular attitudes toward networking.

Because of the prevailing fear of networking, many companies have not discovered that networked "interpersonal" computers are vastly more useful than stand-alone machines. Electronic mail is a glossy example of the benefits, and the advantages of network file sharing and printer access must also be considered.

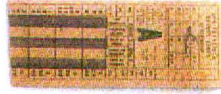
With this travel guide, the inexperienced Net-networker will be able to explore the copious connectivity options for NeXTs in large workgroups.

Apple's networked Macintosh Network File System (NFS) software, even if they're all on the same physical Ethernet.

For NeXT users, all of that is about to change.

Deep in the heart of the NeXT's Mach operating system is a piece of

software called the file system switch. Originally developed by Sun Microsystems in the early 1980s, the switch isolates the differences between different file systems and provides a unified view of the Mach kernel. It's the file system switch that makes NFS work. Every time the user tries to read or write information that's in a file, the switch looks at the file name and sends the request to the appropriate part of the Mach kernel. →



Networking the NeXT

Whether you are networking personal computers or professional workstations, you'll be preoccupied with certain essentials: sharing files, printers, and electronic mail. But first you'll have to assemble a working network.

Networking requires that computers be wired together – but wiring alone doesn't automatically create a network. The electrical signals that pass through the cables must conform to protocols if computers are to recognize the presence of data. Protocol standards are written by standards organizations (such as ISO, the International Standards Organization) or are proprietary (for example, Apple's AppleTalk). Each computer also must recognize the presence of other computers on the network and present access to files on the other computers, requiring a network-oriented operating system.

You can think of network standards as a layered cake in which the lower layers refer to the physical and electrical standards (for example, which voltage represents a 0 and which represents a 1) and the higher layers specify protocols (for example, the way that electronic mail is passed between computers).

PC connections



There are few obstacles to the simple exchange of files between DOS-based personal computers and NeXTs. File transfer across Ethernet is straightforward, given the availability of a wide range of PC-based TCP/IP tools and the fact that 3.5-inch floppy disks glide back and forth between the machines. But full-tilt networking is another story. The vast majority of PC networks use versions of the Novell NetWare operating system rather than DOS. Right now, NeXT and Novell networks do not talk without the costly addition of UNIX add-ons for NetWare.

Happily, NeXT and Novell have been working to eliminate the barriers to NeXT/NetWare internetworking. The next release of the NeXT operating system will allow NeXTs to join Novell networks as NetWare clients. The connection will be seamless: PC-based Novell file servers will show up in the NeXT File Viewer with their own icons, which will behave much like the NeXT's Net icon. You'll drag folders and files back and forth from NeXTs to NetWare 286 or 386 servers with as much ease as you move files within a NeXT today.

Macintosh connections

When NeXTWORLD first looked at Macintosh-to-NeXT connectivity, we found ugly obstacles (see "NeXTworking," *NeXTWORLD* April 1991). The NeXT could read MS-DOS floppies, but without expensive third-party software, a Macintosh floppy was simply ignored. Network connectivity was no prettier – Macs and NeXTs could be tied together by Ethernet cables, but NeXTs refused to recognize the presence of Apple computers without pricey add-ons.

The scenery is about to change, now that NeXT has plans to better integrate NeXT computers with Macintoshes. NeXTs will soon read high-density Macintosh floppies. Perhaps more significantly, NeXTs will recognize Macintoshes across an Apple network. As with NeXT's new support for Novell networks, integration with Macintoshes will be transparent, seamless, and will be included free of charge with NeXTstep 3.0.

While you are waiting, here's a look at today's options for Macintosh-to-NeXT connectivity.



→ NeXT's version 2.0 operating system used the file system switch to add support for MS-DOS floppy disks and CD-ROMs. By placing the smarts for understanding these disk formats inside the kernel, NeXT made data stored on these disks accessible to every program running on the computer.

The same thing is about to happen for NeXT users who work in offices with PC networks. In a few months, you'll be able to just plug your NeXT into an

existing Novell or AppleShare network, and the network file servers will pop up in workspace.

To make this piece of network magic happen, NeXT has developed two programs that will translate the Novell and AppleShare protocols into NFS, says Kevin Wells, a NeXT software manager. From the user's point of view, a file stored on the network will behave the same, no matter which kind of server it

Making the connection

The base layer is the physical connection: the wires. For a NeXT network, the wires are either twisted-pair telephone wire (conforming to the 10Base-T standard) or coaxial cable (RG 58/U). Twisted pair is often already installed between offices and a central utility closet. If so, you need only a twisted-pair hub or concentrator for your wiring "star." For smaller networks, it's often easier to install coaxial cable from computer to computer in a daisy chain.

Above the layer of cables and plugs, the Ethernet protocol provides a way to assemble data into frames that can be sent from computer to computer. Frames can find their way only around a local area network, so another layer, the Internet Protocol (IP), adds an IP address to a frame to make a packet.

The last layer, the Transmission Control Protocol (TCP), is used to transport data from one application to another.

Making the connection

PCs have been joining Ethernet networks for years. Most Novell installations are connected by thin Ethernet coax or twisted-pair; other PC networks use Ethernet interface cards and cabling as well.

Ethernet network interface cards are readily available for PCs and are often discounted to less than \$200. But installation can be messy; you must set several jumpers to specify memory addresses, I/O addresses, and hardware interrupt settings, and these can conflict with other cards, ports, or hard drives. Furthermore, be certain that the software you intend to use supports the Ethernet card you plan to purchase. Ethernet driver software comes with application packages, not with the cards. Once you've found the right hardware and software, you must build a configuration database that includes IP addresses of all the computers on the network.

Making the connection

Macintoshes are most often linked using built-in LocalTalk ports and twisted-pair cable; high-performance Macintosh networks almost always use Ethernet adapter cards and twisted-pair or coaxial cable for Apple EtherTalk connectivity.

Twisted-pair or coaxial Ethernet ports can be added to any Macintosh model for about \$300. Apple and third-party manufacturers offer Ethernet interface cards. Several manufacturers offer Ethernet adapters (attached by SCSI or serial ports) for Macintoshes that have no internal expansion slots (the Plus, Portable, and Classic).

Once you've got Ethernet, your NeXTs will fit right in. Soon, NeXT will support EtherTalk. For now, add Apple's MacTCP driver—a layer of protocol software that allows the Macintosh operating system to send IP packets via Ethernet.

And by making the NeXT speak the language of these PC network systems directly, NeXT obviates the need for special software on the other end or special hardware in the middle. NeXT's Novell client will work with NetWare 286 or NetWare 386. The AppleShare client will work with AppleShare servers running under Apple's System 6 or System 7.

The new software should be available by the first quarter of 1992, says

File transfers

The TCP/IP protocol combination is available for almost every computer system and allows a few rudimentary applications to communicate between any kind of computer. The most important may be a file transfer program, such as `ftp`, which is available as a UNIX command on the NeXT. Use `ftp` to transfer files between a NeXT and virtually any other computer on an IP network. Another file transfer command, `rcp` (Remote Copy), can be used between NeXT and other UNIX computers.



File transfers

It's possible to transfer files between NeXTs and PCs over an ordinary serial cable with a telecommunications application such as Kermit. But if you're going to exchange files frequently, you'll find it easier to set up an Ethernet connection and use a file transfer utility. Several implementations of `ftp` are available for PCs. Popular commercial versions are FTP Software's PC/TCP Plus and The Wollongong Group's PathWay Access for DOS (formerly known as WIN/TCP).

File transfers

If you use both Macintosh and NeXT, you'll find it difficult to live without some form of file transfer.

Three Macintosh applications use `ftp` to transfer files to and from UNIX systems: Network Resources Corporation's MacFTP, Intercon System's TCP/Connect II, and Wollongong's PathWay Access. Each of these compensates for file format differences between Macintosh and UNIX. From the Macintosh, you may choose to transfer files in ASCII mode or MacBinary mode. From the NeXT, you can transfer files using the NeXT's `ftp` command, but an `ftp` server must be running on the Macintosh.

Wells. Although the network clients will be bundled with version 3.0 of the NeXT operating system, they might be made available before that on floppy disk. NeXT will also be adding native support for high-density Apple floppy disks at the same time, he says.

BY SIMSON L. GARFINKEL

Networking the NeXT

File sharing

File sharing is as different from file transfer as a scooter is from a chauffeured limousine. ftp is adequate for the occasional exchange of files, but real networking requires that files from a remote computer appear as if they were stored on your desktop system. Without any commands, you should be able to launch an application and go to work, no matter where a file may actually reside.

NFS (Network File System) is the prevalent file system on most UNIX computers. On the NeXT, the File Viewer is your window into NFS – a window that shows files on remote computers as easily as those on your computer's own hard drive. The other computers don't have to be NeXTs, as long as they are running NFS and their file systems are exported to the network.

Data compatibility

After you've got the file where you want it, will you be able to use it? The answer has to do with the application that created the file and the applications on your own computer.

If you are trying to share data between a NeXT and another vendor's workstation, your best bet is to use the same application on the two systems. Fortunately, most of the popular NeXT applications have counterparts on other platforms.

If you're not using the same application on differing computers, you'll have to exchange the data in a common format. For example, WriteNow can exchange files in RTF, Microsoft's Rich Text Format. Improv can read spreadsheets in the WK1 format. And of course, all NeXT graphics programs can read files in TIFF and EPS formats.

PC connections

File sharing

Your choice of a PC-to-NeXT file sharing approach may be dictated by previous commitments. If you're starting with a fresh slate, the best choice for networked PCs may be NFS, which is much easier to administer than NetWare or competing networks. Each DOS machine will require NFS client software on top of DOS and a TCP/IP transport mechanism. Both FTP Software and Wollongong deliver the goods, in the form of InterDrive and PathWay Client NFS, respectively. Sun Microsystems also offers its PC-NFS package for DOS. If your company has standardized on NetWare, you'll already have a network. If you're using NetWare 386, you can purchase Novell's NLM that allows file sharing between NetWare 386 and NFS networks now, or wait for NetWare client support in NeXTstep 3.0.

Data compatibility

Only a few applications are available in versions for both NeXT and PC: WordPerfect, Adobe Illustrator, and Mathematica. Files from these applications can be exchanged without much trouble.

If you're not using one of these applications, you'll need to exchange information in a common format. Unless your word processor reads RTF, you'll probably push documents back and forth in ASCII. Improv can exchange spreadsheets in WK1 format, which most DOS spreadsheets can read. Graphics are problematic; only the most gifted PC graphics applications support EPS or TIFF files.

Insignia Solution's SoftPC offers the ultimate in data compatibility, allowing you to run a PC application and its files as if your NeXT were a PC clone.

Macintosh connections

File sharing

With NFS software for the Macintosh or an AppleShare server running on a NeXT, the NeXT file server will show up on the Macintosh Desktop. NeXT's promised AppleTalk support will make the contents of Macintosh hard disks available in the NeXT File Viewer.

For now, if you have only a few Macintoshes to connect to a NeXT, you will want to buy an Ethernet interface card and NFS software for each Macintosh. If you have more Macs, you can combine Macintosh NFS software with an Ethernet-to-LocalTalk gateway such as Cayman Systems' GatorBox or Shiva's FastPath. The Mac's built-in LocalTalk cable connects to the gateway box; an Ethernet cable is connected on the other side; and two networks are joined.

Data compatibility

The NeXT's productivity applications all have sisters on the Macintosh. Files created by WordPerfect, WriteNow, FrameMaker, Illustrator, and Wingz can be used on either the NeXT or Macintosh without translation.

If you are using a word processor, such as Microsoft Word, that doesn't have a counterpart on the NeXT, you must save your file in RTF; if your word processor doesn't have RTF, be prepared for straight ASCII text, without fonts or formatting. Among spreadsheets, the WK1 format provides a path between Excel and Improv; Wingz can read and write Excel spreadsheets directly. Graphics files can be exchanged if they are reduced to TIFF or EPS files.

Buyer's Guide

FastPath – Shiva Corporation, One Cambridge Ctr., Cambridge, MA 02142. 617/252-6300

GatorBox – Cayman Systems, 26 Lansdowne St., Cambridge, MA 02139. 617/494-1999; e-mail: carol@cayman.com

MacFTP – Network Resources Corporation, 2450 Autumnvale Dr., San Jose, CA 95131. 408/263-8100; e-mail: NRC.MKTG@applelink.apple.com

NetWare NFS – Novell, 122 E. 1700 South, Provo, UT 84606. 800/526-5463; e-mail: kauger@novell.com

PathWay Access, PathWay Client NFS – The Wollongong Group, 1129 San Antonio Rd., PO Box 51860, Palo Alto, CA 94303. 415/962-7200, 800/962-

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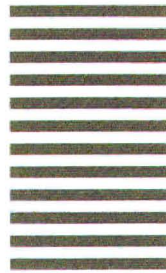
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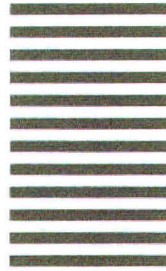
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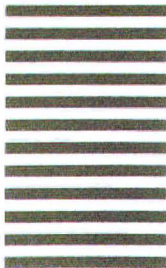
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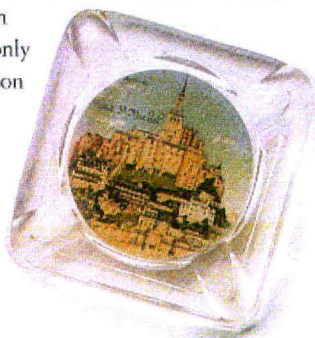
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Printing

NeXT computers can print to any PostScript printer attached to another networked NeXT. NeXT computers can also print to any PostScript printers that are connected to virtually any UNIX workstation running the Berkeley lpd network printing system.

On the other hand, NeXT can print only on PostScript printers. If your organization has a central UNIX system with a high-speed line printer connected to it, your NeXT won't be able to send information to it. Mac and PC printers, even PostScript ones, are also off-limits without complicated gateways – at least until release 3.0 of NeXTstep.



Printing

Printing on a Novell-networked PC printer from your NeXT will require release 3.0 of NeXTstep. Even then, the PC printer must be PostScript. Hewlett-Packard LaserJets, which are common among PC installations, can be retrofitted with PostScript cartridges, though performance suffers. Other types of printers simply cannot be used.

TCP/IP packages allow you to print on a NeXT printer from your PC. If you're running NetWare, you're almost out of luck – even the forthcoming Novell support won't help. However, Microsoft Windows and LaserTools Corporation's Printer Control Panel (formerly Trading Post) allows users to capture print jobs to disk as PostScript files: File transfer can get the file to your NeXT, where Preview can print it on the NeXT laser printer.

Printing

Both NeXT and Macintoshes use PostScript; even though the NeXT printer is a 400-dpi device and Apple LaserWriters print at 300 dpi, PostScript files will print on either without obstacle.

Unfortunately, you can't share one PostScript printer on a NeXT/Mac network without several thousand dollars of add-on hardware. Though a LaserWriter can be used on a NeXT serial port, a NeXT won't find it unless you use an Ethernet-to-LocalTalk gateway plus appropriate software. It may pay to wait; NeXT's forthcoming EtherTalk support will enable NeXTs to talk to PostScript printers connected to Macintoshes.

A practical, if cumbersome, solution to sharing PostScript printers among Macintoshes and NeXTs is to direct a PostScript print job to a disk file. You can use file-transfer or file-sharing software to move the PostScript file between the Mac and NeXT for printing.

Mail

The Simple Mail Transfer Protocol (SMTP) is the Rosetta Stone that decodes the dozens of proprietary mail systems in tens of thousands of isolated installations. The NeXT platform supports SMTP via NeXTmail. With NeXTmail, NeXT users can send and receive mail from any other UNIX-based computer or any PC, Macintosh, mainframe, or minicomputer that uses SMTP as its mail protocol.

If you are exchanging e-mail solely between NeXTs, you can send multimedia mail, with italics and bold in the text, as well as file and picture attachments. But if you want to send mail to any other platform, you'll have to stick to plain ASCII text.

Mail connectivity is not limited to LANs: Network users can exchange mail globally by inaugurating a UUCP connection to the Internet (see "Linking Into the Internet," NeXTWORLD Fall 1991).

Mail

Unlike the UNIX universe, where electronic mail can originate from every computer and SMTP guarantees that it is delivered, the world of PC LANs suffers from a hodgepodge of proprietary e-mail standards. Fortunately, almost all LAN e-mail systems on PCs can be routed to SMTP-based mail systems by way of software-based gateways. Gateways vary in cost and convenience; your PC LAN e-mail vendor can tell you how easy it is to connect to the worldwide UNIX-based mail systems.



Mail

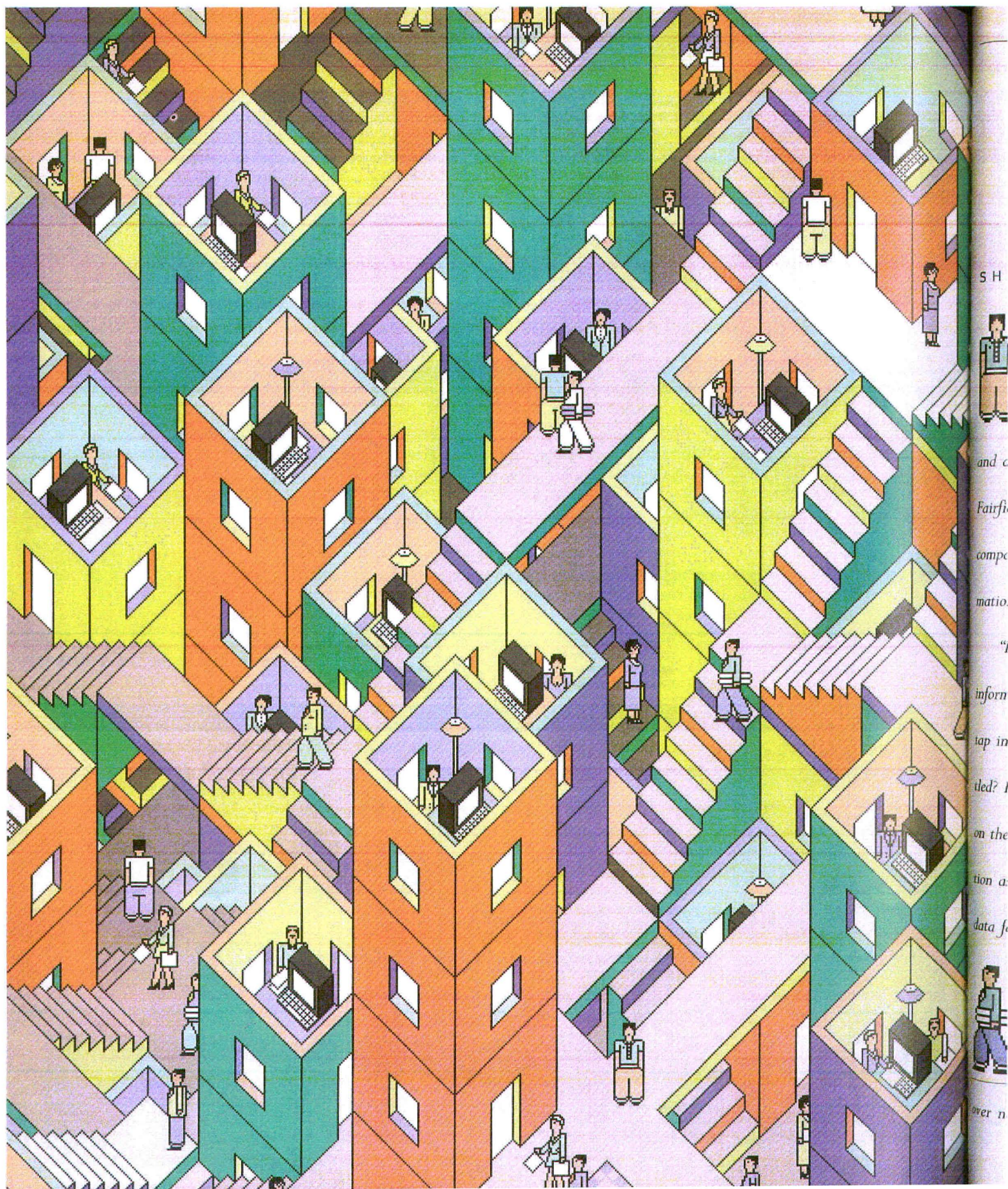
Mail is not standard on every Macintosh. But most Macintosh mail applications, such as CE Software's QuickMail application, Microsoft Mail, and Sitka's InBox Plus, offer optional software gateways to SMTP-based mail systems that enable users to exchange text-based mail.



DANIEL KEHOE AND SETH T. ROSS are NeXTWORLD contributing editors. They can be reached at kehoe@nextworld.com or seth@nextworld.com.

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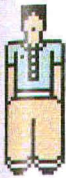
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INTERPERSONAL COMPUTING AT WORK

SHARED APPLICATIONS TRANSFORM THE WAY ORGANIZATIONS OPERATE.



"LA Law" has nothing on Northern States Power. The Minneapolis electric company's legal department is a step ahead in every legal game, thanks to 28 NeXT systems and a case management system custom-designed by Boss Logic of Fairfield, Iowa. The software tracks all legal cases in which the company is involved, providing immediate access to detailed information for the company's attorneys.

"It tracks absolutely everything," says Dorie Kandler, a legal information specialist. "It will be used by management so they can tap in and say 'What's happening with this case? Has it been settled? Is it open? When is the date it happened? What is the status on the case?' " The attorneys also will be able to use this information as background and reference for other cases, retrieving the data for themselves, she adds.



This is the type of application that NeXT has in mind when the company talks about interpersonal computing (IPC) — people sharing data and ideas over networked workstations. NeXT has promoted IPC as a key

advantage of its technology because the combination of multitasking, interapplication communication, and interface consistency offered in NeXT computers is ideal for sharing data across applications and across networks.



With NeXT's tools in place, the key ingredient in IPC is a new class of software that facilitates group interaction. The precise nature of the software — what's been called "groupware" on PCs — is hard to define because the field is only now being explored. But NeXT users are quickly discovering that the ability to share data, exchange mail, and use software to collaborate in real time has boosted their productivity and changed the way their organizations function.

The beauty of Northern States Power's application, which will be called Boss Law and is now in beta testing, is that it will be able to integrate all of the documents relating to a case. "If we don't have it on-line, we plan on scanning it in or even typing it. Then we can do actual searches through each and every document," says Kandler. ►

BY SHARON FISHER

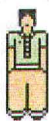
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WINTER 1991 NEXTWORLD 27

SHARING FILES AND FACTS

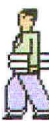
One of the most basic types of interpersonal computing is managing and sharing files among members in a group. NeXT's folder system makes organizing and sharing documents a breeze.

For example, at Allegheny College in Meadville, Pennsylvania, students and teachers use folders to organize an electronic library of course material, as well as to submit their assignments, explains Joel Smith, director of educational computing and assistant professor of philosophy.



Folders, arranged by course and subject area, contain applications and information relevant to particular assignments. The students save their assignment files in subfolders in their own directories, which only the professor can open. Professors grade the assignments either by inserting comments in a different type font or through an application that allows them to make voice annotations.

One application Smith has developed is called "the library." Students use the system to describe problems they're having; other students are assigned the task of looking through the problems and offering solutions. "The important thing isn't to build up the library as much as it is to go through the process of defining problems and solving them," says Smith. "It's a collaborative learning process."



The William Morris Agency (WMA) in Beverly Hills, California, has set up a series of folders to help users manage both technical and business tasks, says Alex Henry, director of management information services. "We've set up the WMA Library, mounted on every single machine," he says, "which contains all sorts of files that users might need" — how to change passwords, administrative tools, and templates for word-processing files. In addition, certain departments have their own sections within the library, such as a checklist of important steps to follow when completing a deal.

FASTER BY E-MAIL

Electronic mail is an important way for people to work together, sometimes in unexpected ways.

"Last summer, some *Los Angeles Times* reporter had written an article that an agent here thought would make a good movie of the week," Henry recalls. After making a couple of calls to the *Times* without success, the agent put e-mail out to "all" saying, "Anybody know this reporter?"

As it turned out, the WMA's chief financial officer knew a friend of the reporter. "In the past, the agent would have asked two or three agents and never would have made the connection. It wouldn't have occurred to him to ask the CFO."

Electronic mail also makes things happen more quickly, says Henry. For example, if an agent was briefed by Disney on the studio's needs, the agent might make a few calls "but most likely would wait till the weekly staff meeting" before reporting back to Disney. "Now, the agent can send e-mail immediately, and responses could start pouring in that afternoon."

"E-mail has dramatically dropped the amount of paperwork around the company," says Henry.

"One of our senior executives has said that e-mail has fostered a much greater sense of teamwork between the New York and Beverly Hills offices."

At Allegheny, both students and faculty make heavy use of the electronic-mail system as well. "We were initially concerned that [computerization] would isolate us from the students, but e-mail has had the opposite impact," Smith says.

"Students who would have been shy to come to our offices get to know us through e-mail."



The ability of NeXTmail to include files and diagrams in electronic mail messages has been an advantage for William Shipley, a Seattle-based consultant. "It's made everything easier. If I want to send a client a resume, I just drop it into NeXTmail and fire it off. With one project, I would send PostScript graphics and show the client what I was thinking about. I'm also including binaries — actual running programs.

GROUP APPLICATIONS

Some NeXT applications let people work together on a single document, drawing, or database at the same time. One such program is Greyboard, a multi-user, network-based white-board simulator available from the NeXT ftp archives. "It allows multiple users to interact with the same screen at the same time. It's the first time I've seen that on any computer," says Shipley.

A similar program that works with text documents is Live Wire, produced by Adamation of Oakland, California.

Live Wire users modify a particular portion by highlighting it. "Once you're done with your edit changes, you paste it back, and everyone on the network sees the changes you've made," explains Adamation president Stephan Adams. If any other user tries to gain write access to a section that is being modified, they get an error message.

According to Adams, the program allows users to work on the part of the document in which they specialize and allows changes to be made to documents more quickly without faxing them back and forth. "With this, you can put it up and the editor can make changes and do corrections," Adams

IPC AT NEXT

The most sophisticated user of NeXT-based IPC applications may be NeXT Computer itself. Under the leadership of director Alex Gray, NeXT's Information Services (IS) department has built applications that handle electronic forms for everything from purchase orders to requests for time off; schedule conference rooms; and help Gray manage a network far more complex than the networks of companies ten times NeXT's size. To manage the burgeoning number of NeXTmail mailing lists, Gray's staff wrote AliasManager. Aliases are ways of addressing e-mail to one addressee and have it go to an entire group of people, such as a committee. Instead of burdening the department with requests to create new lists, the application allows employees to create their own. But each list has an expiration date: A week before it is due to expire, AliasManager automatically sends mail to the list's owner with a notification of its impending destruction. If the owner doesn't take action, the list is purged.

Amazingly, that simple program has reduced requests to IS by 50 percent. "There's a theme here. The system automatically maintains itself," says Gray.

NeXT still hasn't come up with a paperless office, but it's getting closer. Using NeXTmail as a starting point, the company has built an internal system for filling out and processing electronic forms. Forms are hidden underneath icons; they're mailed from user to user by electronic mail in much the same way that paper forms are sent around offices with interdepartmental mail. The content of each form is stored in its own file, says Gray, so double-clicking the form's icon pulls up a program that lets requests be made, changed, and authorized.

For example, running the Check Request program creates a window with a form for the user to fill out. When the form is completed, the user

saves the check in a file, then drags the file's icon into a mail message and sends it off for approval. When a manager receives a check request in the mail, he or she approves it by clicking a menu option; the program then asks the manager for a user name and login password. If they're properly entered, the program adds the approval to the form. The files that contain the check information encrypt and run a checksum operation to prevent unauthorized modification, says Gray.

NeXT employees use an IPC program called Room Z to schedule conference rooms. Run Room Z and you'll see a map of the building that you're in; click on a conference room and you'll get a list of meetings scheduled in that room. Room Z knows which conference rooms in NeXT's offices overlook the marina; it can also list all of the rooms that can seat 35 people, have a slide projector, and are available next Thursday afternoon.

Some more-complex applications access the company's database. Who's Who is a corporate roster that shows the face, phone number, title, and other personal data of everybody in the company. A more serious program is SIS, which lets NeXT's sales force tap into the company's Sales Information System database.

Custom IPC applications aren't just fancy demonstrations of the technology, says Gray. They let people inside NeXT get their job done quickly and efficiently, without a lot of administrative overhead. But don't count on these programs getting out of NeXT anytime soon — these are internal applications only. Gray's hope, however, is that ambitious third-party developers will be inspired by NeXT's internal applications to develop their own commercial products.

by Simson L. Garfinkel

says. "You don't have store-and-forward, but a true workgroup. Users work much faster because they don't have the delay of 'let me get back to you on that part.' There are fewer revisions because you're working on the first drafts together. Also, when you're working in the group, you have more cohesiveness because everyone has to work with one another."

SHARED DATA

A basic form of IPC is sharing data across the network. For example, with the Boss Law application, the case management and document management applications are also tied to a contact file, which is like a big Rolodex, says Kandler. "On other systems, it's all separate applications."



William Morris is also developing a common telephone directory, says Henry, putting its clients' photographs, resumes, and credits on-line. Henry says, "Now, we have to call

up the client and get the information and picture from them. If it's 5 p.m. in California and the agent is in New York, then we have to wait until the next day."

In this category, Adamation offers Who's Calling?, a relational database with a user-friendly interface that allows users to make queries against the database and retrieve information in the form of graphics, voice, and data. In version 2.0 of the program, database records can include photographs, voice clips, and documents.



This offers two advantages — first, all the different types of data are available in one place. "Everything's retrieved at the same time,"

Adams says. "It's much faster and much easier." In addition, the variety of data available makes it easier for users to form a more complete picture of the information than if it were simply text.

WHY GO TO WORK AT ALL?

Eventually, IPC capabilities may help companies implement telecommuting — employees using electronic communications equip-

ment to work at home on company computers. Teleconnect from Marble Associates (see the review in this issue) allows remote logging in to a network. Using this tool, users can work with Live Wire remotely, says Adams. "It works just as on a local network."



"It ends up that I don't have to go anywhere anymore," agrees Shipley, who recently accepted a consulting assignment that normally would have required his presence in California. Now he won't need to relocate.

"Three years ago, I couldn't have made that kind of decision. But enough people out there are willing to hire me in Seattle and let me ship them the work. I'm freed up from having to go to an office." ☛

SHARON FISHER is a San Francisco-based free-lance writer specializing in data communications. Her mail address is slf@well.sf.ca.us.

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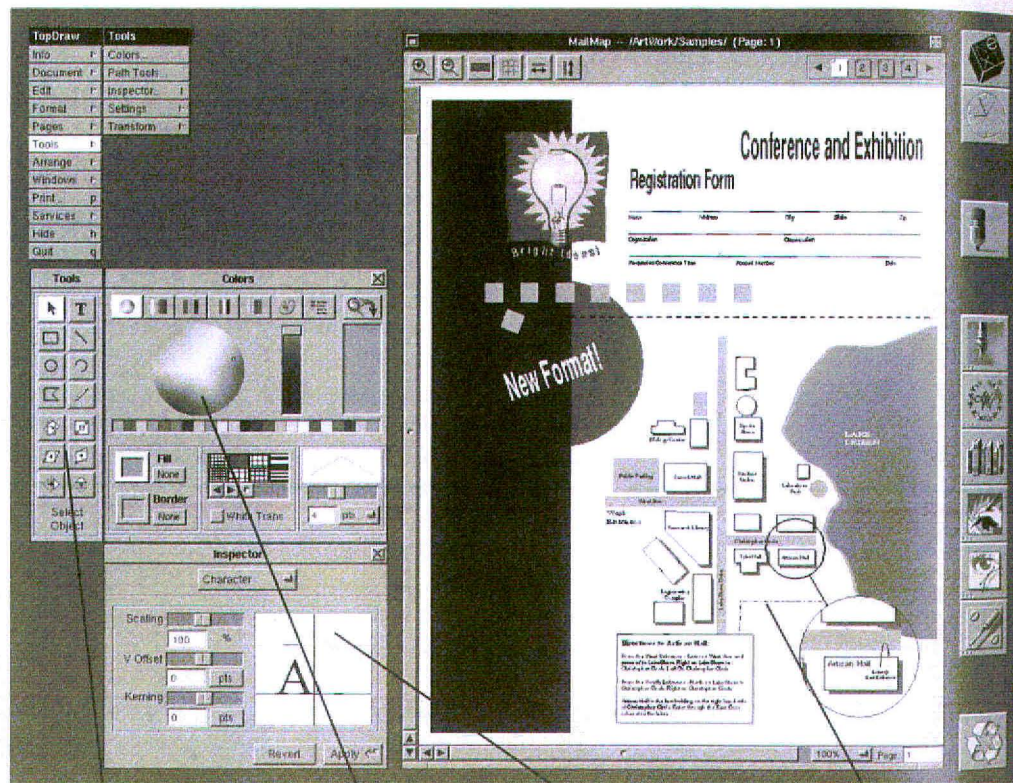
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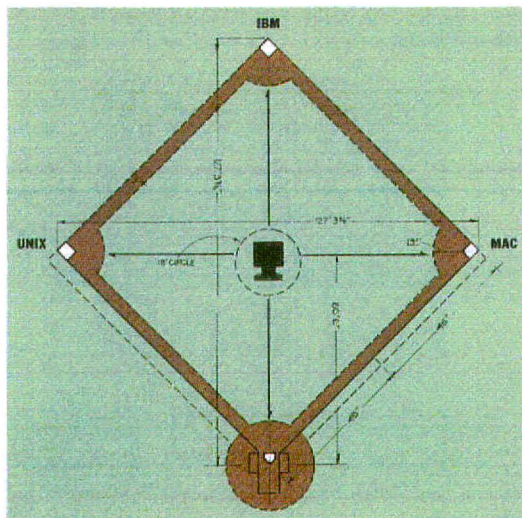
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✓ **Covering the (Data) Bases**
2 **NeXT's forthcoming DBKit will enable point-and-click access to diverse databases.**
it... **Database management is probably the central computer application, so the NeXT platform's shortage of database tools has its most deficiency. NeXT has database tools—servers from Sybase and Oracle – costing thousands of dollars and more. But there have been no good tools for using these servers nor any tools for accessing ▶**



By Simson L. Garfinkel

databases that reside on non-NeXT systems.

All that is about to change. For starters, some third-party database solutions are in the works, including server software from Ingres and a flat file system called Dataphile from Stone Design. NeXT itself plans to include a slick database system, called DBKit, in Version 3.0 of its system software, which will permit in-house developers to create sophisticated front-end applications to interface with database systems on other platforms. With DBKit, NeXT hopes to turn database handling – now a deficit – into a competitive advantage.

DBKit will slash the time users need to develop programs that access information stored on a centralized database, the same way that Interface Builder and Objective C have cut the time to write programs with a hot user interface, says Adam Hertz, who heads NeXT's information architecture group. That's not terribly surprising, since DBKit is based on the

same principles of object-oriented programming as the NeXTstep Application Kit.

The system is targeted at in-house programmers, system integrators, and VARs who need to write small, custom applications to access large databases. Already, preliminary versions of the system have been shipped to a few select developers.

One interface

DBKit lets a person virtually draw a database client application without writing a line of code. Using NeXT's Interface Builder, a programmer can create an empty window and drag in icons, buttons, and data windows from a palette of objects. You specify which fields of the database should be displayed when you connect the icons together. Clicking "Test Interface" makes the application run. For example, in a short period of time a non-expert can build a simple application that

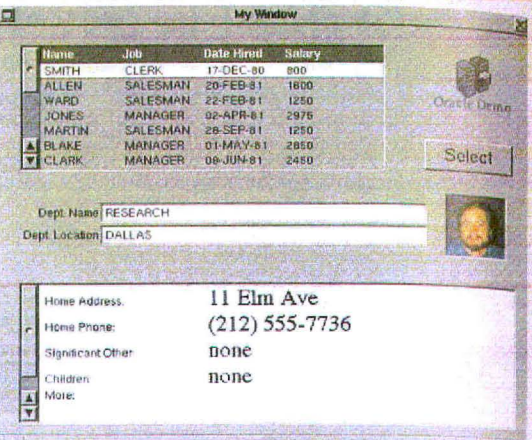
allows the user to search a database for a list of employees, click on an employee's name, and then display the employee's image on-screen.

"From what little I've seen, it looks as though it's an excellent concept and implementation. It's a lot more thought-out than Apple's Data Access Language (DAL)," says Robert W. Beth, president of a Hawaiian consulting firm that received an early release of DBKit and is developing a database application with it.

Like Apple's DAL, NeXT's DBKit provides transparent access to any database that uses Structured Query Language (SQL). But DBKit also provides a general-purpose framework for accessing any

other database, including traditional main-frame systems based on ISAM or KSAM. And it's written so that programmers can develop their own DBKit interfaces to their databases, without the need for hand-holding or proprietary information from NeXT.

Programmers writing database applications today have the legacy of databases from the past 20 years to work around, Beth explains. But using DBKit, "we are able to write an application that will be far more



A database retrieval panel written with NeXT's DBKit.

"With DBKit, we can write applications that are more general than if we had to go down into the lower levels."

general than it would be if we had to go down into the lower levels."

DBKit also opens up information sources other than relational databases, says Hertz. For example,

the DBKit can access information stored in the NetInfo database or the UNIX file system. Adapters are planned for Digital Librarian, database services (like Dow Jones News Retrieval), and the Wide Area Information Service project at Thinking Machines Corporation of Cambridge, Massachusetts.

Of course, DBKit's generality comes at a price. By glossing over differences between databases, it also hides each system's strengths. But DBKit means that a program designed to work with one database today will work with another database tomorrow with little or no modification. DBKit should make it easier to adapt an existing application to new environments.

"It is one more incentive that we have for developers to use our platform – they get this database access layer for free," explains Hertz. "It's analogous to the rest of the Application Kit philosophy: You give developers big levers and you don't make them pay."

Three-part harmony

DBKit is divided into three harmonious main parts that complement and strengthen each other but nevertheless remain distinct.

Interface. DBKit's top level, or Interface Layer, is a set of NeXTstep user-interface tools designed for use with NeXT's Interface Builder palette. The most important tool is the database icon, represented by a filing cabinet. The database icon maintains a connection, through the DBKit's lower layers, with a remote database. By sending Objective C messages to the icon, the programmer can perform searches on the database; step sequentially through a group of records; and retrieve, update, and delete information.

Using Interface Builder, the programmer can connect the database icon to other NeXTstep user-interface tools, such as matrices, forms, and cells. When a connection is made, the programmer specifies which field of the database record should be sent to the user-interface object. When the program runs, the data can be automatically

Clients and servers

Most database systems have several parts:

The database client, or front end, is the part of the database program that most users see. The front end displays the database's entry forms, lets the user perform searches, and generates reports. It typically runs on a personal computer or on a workstation. NeXT's DBKit is designed to make it easier to write front ends.

The database server, or back end, is the program that holds the data. Since it is a very difficult proposition to write a program that stores hundreds of megabytes efficiently, and since a typical database server can support literally hundreds of users simultaneously, database servers tend to be very expensive.

brought up on the screen.

Other tools that have been developed for DBKit include a special database browser that displays selected fields from a group of searched-for records, and an image well that displays bit-mapped images. DBKit can also work with Interface Builder palletes offered by third parties – for example, OTPalettes: 2.0, from Objective Technologies, a financial consulting firm in New York.

"We are finally starting to get software ICs," says Beth. The concept of a software integrated circuit, in which programmers working at one company can develop software parts that can then simply be plugged in by programmers at other companies, is one of the central ideas behind Objective C.

Of course, some difficulties have arisen. Interface Builder had to be extended in significant ways to work with DBKit, says Hertz. But what's surprising is how few changes had to be made. "One of the goals of the Interface Layer is to use generic controls for the data display," explains Hertz. In other words, all of the DBKit objects work with the standard NeXTstep user-interface tools.

Access Layer. Underneath the Interface Layer is DBKit's Access Layer. This layer consists of the Objective C classes and methods that an application would communicate with to access data stored in a remote database.

The beauty of the Objective C interface, says Margaret Chan, a NeXT developer advocate, is that it gives programmers a single, unified way of communicating with information sources. "Historically, when developers built a database application, they had to pick a database system and stick with it," says Chan. "This way, they can develop a database application that is portable."

Having a single interface also

makes it easier for a programmer to simultaneously access data stored on a variety of servers that have a common interface. "Companies store information in lots of different databases. They also need access to information in third-party services like Dow Jones," says Chan. The single interface means that programmers have less to learn in order to get their jobs done.

Adapters. Of course, some part of DBKit has to be customized for each different database protocol. That part is the DBKit's bottom layer, a set of modules called "database adapters."

A database adapter is a special Objective C class that connects the DBKit with specific databases. When DBKit's Access Layer wants to log on to a remote database, it

sends a message to the database adapter that performs the log-on sequence. Other (documented) protocols implement the four basic verbs of SQL (select, insert, update, and delete), as well as a data dictionary protocol that lets the Access Layer determine what kinds of data elements are stored in the remote database. The adapter manages the connection between the DBKit and the database server. It also translates the DBKit commands into the instructions required by that server.

Because the interface between the Access Layer and the database adaptor is documented and well defined, developers can write their own adapters if none exist for a particular database. "It's really not that difficult to do," says Chan, adding that one company developed the adapter for a relational database system in less than two weeks. NeXT is now actively

recruiting companies to write adapters for DB2 and IMS, two databases common on large mainframes.

Is it enough?

Steve Zalewski, director of the UNIX Products Division at Oracle, NeXT's neighbor in Redwood City, is excited about DBKit – but with reservations.

"This is certainly an advantage for developers," says Zalewski. "It is consistent with a lot of things being done in the industry right now."

Indeed, says Zalewski, the idea of having a common protocol for communicating between an application program and an SQL database is a primary goal of the SQL Access Group, a trade organization

that counts both Oracle and Sybase among its members. "I think it is clear that [most companies] want to offer programmers a common interface for a

choice of databases."

But Zalewski wonders whether DBKit will be so general-purpose that it will be less useful for people doing demanding jobs requiring relational database access: "The problem with having any kind of standard interface is you have to make tradeoffs. There is clearly an advantage to programmers in being able to access the widest range of databases. But whenever you make an engineering tradeoff, you give something up. Because you are [broadening] what you can access, you don't know what you are accessing. You don't know that it is a relational database and that you can use relational commands in there."

There are also some other unre-

solved issues with the current state of the technology. For now, DBKit doesn't let the programmer create or modify database structures except by explicitly sending SQL directly to the database server.

Another needed feature, says Hertz, is a way to publish a list of databases available to the user.

The problems should be addressed before NeXT releases NeXTstep version 3.0 in 1992. When it does, NeXT will not only have covered its (data) bases, it will have added a powerful new tool to its kit bag of competitive advantages. ■

SIMSON L. GARFINKEL
is a senior editor at NeXTWORLD.

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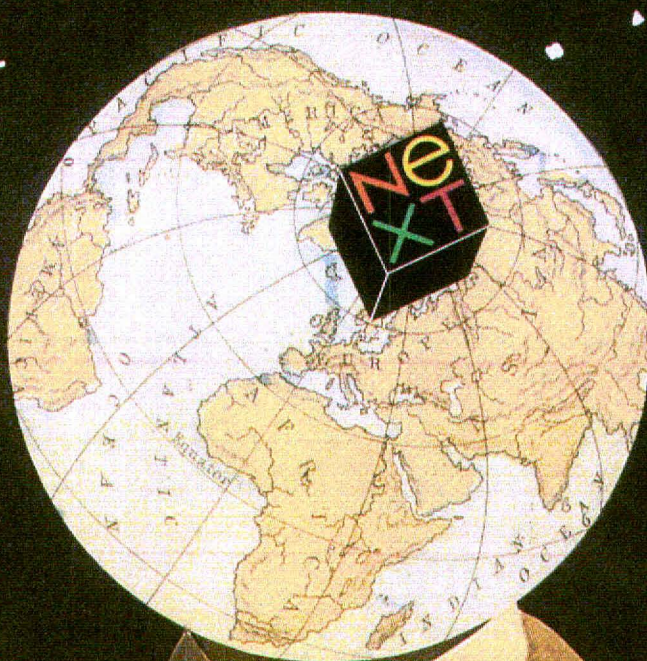
\$5100 for entry-level, single-user server. Oracle Corporation, 20 Davis Dr., Belmont, CA 94002. 415/506-7000; 800/345-3267

Sybase SQL Server

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SWISS WATCH

*Florian Gutzwiller
Swiss NeXT User Group
e-mail: snug@open.ch*

In Lisbon, a physics professor does cutting-edge physics in real time. In Helsinki, music wafts out of speakers connected to a slab. In Tokyo, an analyst builds a model in Improv using Japanese characters. NeXT has gone global – and with a vengeance.

Many factors have combined to make NeXT's international prospects strong, and they're growing stronger. Hard lessons learned at Apple and a changing high-tech market persuaded NeXT's founders to keep the international market in sight at all times, and that foresight is paying off. Almost half of NeXT's second-quarter 1991 sales were overseas, and NeXT projects that non-U.S. markets will account for an even greater percentage of sales in the future.

The needs of NeXT's markets around the world overlap and converge in both expected and unexpected ways. The sidebars to this article introduce some of our international correspondents, who will also contribute to future issues of *NeXTWORLD*, letting us know what their countrymen are doing with the NeXT, what they need from the computer, and how NeXT is addressing their concerns. Meantime, here's an overview of NeXT's global market and NeXT's activities in it.

A UNIVERSAL POWER

Plug a NeXTcube into almost any outlet anywhere in the world, and you're in business; the local voltage is automatically supported. This type of detail is small but significant, illustrating the importance NeXT places on international compatibility, and how central a place that concern has in the design process.

During the past ten years, as overseas markets for high-tech

The Swiss are a little bit cramped in dealing with high tech. In the United States, high tech is a part of everybody's life. Here in Basel, a city with 203,915 inhabitants, people are still waiting for cable TV, and every fax machine or microwave oven has some magic in it.

The most recent NeXT presentation, at the local PC user group, was like a circus. The numerous Word for Windows users got very nervous when they saw how I was dragging 1.5MB color PostScript files into WordPerfect documents and aligning text around them. When I ran Mandelbrot and Molecule side by side on the 4-by-4-foot RGB projector, a loud murmur went through the audience as if I were making a handstand and spitting fire.

NeXT has sold about 500 machines in Switzerland. User-group activity is just beginning, but Switzerland's small size (300 miles from one end to the other) is in its favor: Active know-how transfer is already under way, with e-mail a key factor. We are just about to network all the NeXT users in our area.

Internationalization is the big topic for us. NeXTstep 2.1 supports the Swiss German keyboard, but Lotus Improv and other applications just ignore it. Software manufacturers should take five minutes to think about the NeXT users beyond the U.S. border. NeXT should also give attention to its German version of the operating system. We don't want German menus, but German spelling checkers would be nice; a German dictionary should be included for free.

products have begun to flower, computer hardware and software companies have been scrambling to move into them. With that experience behind them (many of

NeXT's people did their scrambling at Apple), and with an eye to the opportunities ahead, NeXT's designers made sure that international issues were kept firmly in mind.

To meet this goal, NeXT decided that it was important to have just one product to sell all around the world. In this way, NeXT could enter new markets with minimal expense and serve a broad variety of markets.

Special care was taken to make the machine easily acceptable to foreign regulators, leaping over hurdles that have left other computers rotting on the docks of Europe and stalled in the customs warehouses of Japan. This meant paying attention to U.S. technology-export restrictions, building a magnesium shell to shield radio interference, and other measures. While universal components come at a premium, NeXT is banking on the theory that, over time, economies of scale in manufacturing and shipping will offset up-front costs.

The advantages of the approach are illustrated by the NeXT's packaging. Every NeXT computer ships in three boxes: one for the MegaPixel monitor, one for the CPU, and one for the Starting Point Kit. Only one of these, the Starting Point Kit, contains materials that need to be localized for overseas users – the keyboard (customized for the characters and accent marks for English, French, German, Spanish, and Japanese), the power cord (with the correct prong configuration for local sockets), and the software license and user documentation (translated into the appropriate language



JAPAN

RISING SUN

*Arthur C. Kyle
Canon, Japan
akyle@cpu.canon.co*

Canon, NeXT's partner in Asia, finished the Japanese version of the operating system in May, and system upgrades, complete with Japanese language user manuals, are making their way to users throughout the islands. Canon claims that about 1000 of the '030 machines are in Asia (mostly in Japan), and NeXT claims close to 1300 CPUs shipped to Canon in the first quarter of 1991. But most people are still waiting to see real Japanese-language support before they buy. So far, customers tend to be software developers interested in what might be coming next, as well as technical and research labs and universities. There have also been sales in the financial market.

Canon's expansion of its distribution channel in Japan to include Canon Sales (a major distributor of the Macintosh) will give the NeXT machine needed exposure, but it remains to be seen how much energy Canon Sales will devote to the machine. Tech support and software and peripheral sales are also major requirements.

No list of woes would be complete without laments over the price of the NeXT machine in Japan. Canon has set the price for a basic 8/105 monochrome NeXTstation with the Japanese OS at ¥1,280,000, more than US\$9000. Why so high?

Despite obstacles, the potential for the NeXT in Japan is high. Canon is actively courting U.S. developers to localize their apps, and a number of commercial packages from Japanese developers are in solid beta and should be out by the fourth quarter of 1991.

and taking into account local regulations).

This modular approach makes it possible for NeXT to use one manufacturing and packaging line for the hardware on every computer it ships. It also enables NeXT to entrust localization efforts to local distributors – the Kanji keyboard, for example, is available only through Canon, NeXT's Japanese distributor. This is an advantage both to NeXT and to local resellers, who can take control of their own markets without waiting for NeXT to target it.

THE LOCAL LINGO

A shipping copy of Improv is pulled out of the box, loaded on a Japan-localized NeXT, and it is running in Japanese, even though Improv was completed long before System 2.1J (the Japanese version of NeXTstep) was even in alpha. This is no accident: Every element of NeXTstep is designed to be fully international.

Display PostScript's appropriateness for internationalization was an important part of NeXT's decision to use it on its machines. Unlike character-based systems, which depend on ASCII codes to signal letters of an alphabet, Display PostScript treats every character as a graphic representation, whether it's an English character, a Japanese ideogram, or a picture of an hand using international sign language. Low-level system software accepts international character sets and keyboards, and new keyboard and font definitions can be dropped into special system folders at will. Then, end users simply select the language they prefer using from the NeXTstep Preferences panel. This cuts the time it takes to create a foreign edition of software from years on any other platform to weeks on the NeXT.



FRANCE

BON VIEUX NeXT

Thierry Charles

NeXT Developer #2138, President FaNG

e-mail: charles@crim.fr

NeXT's relationship with France began in 1987, when Jean-Marie Hullot arrived in California. He had created a program named SOS Interface, written in Lisp for the Macintosh. When it was demoed for Steve Jobs, he said, "We want this on our machine." NeXT bought the rights and turned it into Interface Builder.

A national user group (FaNG) was co-founded by NeXT developers Michel Coste and Hullot. The user group publishes a quarterly newsletter, *Inspector*. The first official NeXT event in France, in November 1990, was orchestrated by Hullot for 500 developers interested in NeXT. More than 100 developers are now registered.

NeXT Computer France, founded in December 1990, has created a network of about 30 NeXT resellers and VARs throughout the country. The first one, located in Lyon, is aptly named "El Camino Real."

Since the end of April, NeXT computers have begun to sell. Large companies and government organizations are buying them – Electricité de France, the nationwide electrical utility; France Telecom, which provides all telecommunications, telephone, and databank services in France; and universities in Paris, Lyon, Montpellier, and Nice are among major customers.

NeXT in France also means NeXT Europe, which moved its headquarters to Antibes, near Nice, in July. Now a significant part of Hullot's developer team is coming to work in France.



AUSTRALIA

NEXTS OUT BACK

Cameron Bromley

OzNeXT, the Australian NeXT Users Group

e-mail: cdb@codex.oz.au

The last element in NeXT's international plans is its icon-based interface, designed for international communication.

SELLING ABROAD

NeXT's overseas marketing is as focused as its product strategy. Target markets are carefully selected – and then subjected to a minutely orchestrated sales campaign which is based on key local partnerships.

The first step is selecting local partners. They must be motivated, well-capitalized, a major force in the local market, and willing to commit significant resources – in Europe, resellers must commit to a \$1 million investment in infrastructure (such as training and facilities), exclusive of inventory, in order to qualify. One hundred of these NeXT Centers are already in operation. With the partner, the local NeXT office creates an advertising and marketing program that includes training programs for users and dealers. Then NeXT recruits local developers and creates service centers.

For the present, NeXT has chosen just two major markets in which to sell: Western Europe and the Pacific Rim. (Canada is covered by the domestic sales force.) Unfortunately, this leaves other major markets clamoring for machines. According to Max Henry, NeXT's vice president of Pacific Operations and former head of developer partnerships in Redwood City, California, "NeXT feels it's very important to do the right thing in the markets it serves, therefore we prepare carefully and makes sure we have all the essential pieces in place before entering the market. Therefore it's better to have no machines at all than to have machines poorly supported in a market."

NeXT Europe's offices, soon

Australia has – at most – 20 NeXT machines in the country, all smuggled in from abroad. Australia, like many other countries, has no NeXT distributor. It seems that the NeXT deal with Canon for distribution in Southeast Asia specifically excluded Australia. The result is that it is impossible to buy a NeXT machine in Australia.

Since Australia has a global share of about one percent of the world computer hardware and software markets, it's hardly surprising that Australia is not at the forefront of NeXT's marketing efforts. But Australia is often used by large companies as a testing area for new products. Has anybody in the States heard of the IBM JX personal computer? It was released here in 1985 to gauge market reaction and never made it to the real world.

The good news is that the machines that are here are supported very well, albeit informally, through OzNeXT. And those with "official" machines, such as Codex Software Development, have good direct NeXT tech support through e-mail. And, of course, Internet makes the world small. There are persistent rumors that NeXT will do something here Real Soon Now. NeXT machines are currently in use for a wide variety of tasks, ranging from simple word processing to UNIX/BSD development platforms, proprietary production systems, and arcane (but fun) fractal landscape-generation applications.



GERMANY

FAIR START*Martin Ortlepp**Hannover NeXT User Group**e-mail: martin@cube.han.de*

NeXT entered the German market with its appearance at the CeBIT '91 fair in Hannover. From a small booth, NeXT demonstrated the whole product family, from the monochrome station to the NeXTdimension. On all seven days, the booth was jammed. With 500,000 attendees, the show is the largest in the world, and NeXT's was among the ten most-visited booths.

That was NeXT's first introduction in Germany. Now, four months later, NeXT computers can be found in companies and universities all over the country. Especially in the desktop publishing market, NeXT has become a competitive system.

NeXT's price strategy in Germany could be a problem. NeXT offers a discount of 5 percent for an order of one to nine machines and 10 percent for ten machines and up. This makes it hard for students to purchase NeXT machines, especially if you keep in mind that the prices are higher here than in the United States. There's no doubt that NeXT has the best relation between price and performance, but NeXT sales would be better if there were a slight revision of import pricing politics here.



CANADA

NORTHERN LIGHTS*Robert Lin and William Barr**TAO Newsletter**rlin@cs.ubc.ca*

The slow pace at which businesses are beginning to enjoy the NeXT is no fault of NeXT's. Rather, it is the result of confusion in the minds of business executives about the UNIX marketplace and the role of NeXT in that arena.

On the other hand, the Canadian NeXT development community is ambitious and vibrant. Vancouver, British Columbia, is particularly active, with user groups at Simon Fraser University, the University of British Columbia, and the Vancouver NeXT User Society. The prominent Vancouver developer is Microstat Development Corporation, developers of OMEN III, a stock market analysis package.

Canadian universities lead the way in the use of NeXT computers. A group at McGill University in Montreal successfully ported version 4 of X Window to the NeXT. Also under development is a language for algebraic manipulation, called ALDAT. At the University of Alberta, a research group is developing groundbreaking geophysical modeling techniques on a Cube using Mathematica. Tom Poiker, at Simon Fraser University, uses the NeXT to teach mapping. The University of British Columbia just completed its first year of operating a NeXT lab of 40 computers for undergraduates.

Business tends to follow the path opened by universities. If this tradition is followed, the investment NeXT has made in the Canadian academic and software development communities will begin showing dividends in another year.

oped to enable the entry of Japanese characters on reasonably sized keyboards). Unlike other Kana systems, 2.1J makes it possible to type directly into a document, bypassing the translation window necessary in less-integrated Kana-Kanji systems.

Another key advantage is Display PostScript. Character-based displays, such as those used by the Macintosh and X Window workstations, require the computer to store a bit map of each character in each size that you want to display — a real hardship, given the immense number of Japanese characters. Thanks to Display PostScript, the NeXT can store a single representation of each character. Then, the 400-dpi resolution of the NeXT laser printer provides substantial advantages over the standard 300 dpi in imaging the graphic Kanji characters.

The opportunity for NeXT in Japan is vast. In the 1980s Japan automated its factories. Now it is ready for the next wave, computerizing its abacus-dependent back offices. And unlike the United States, the market is wide open, with no established standards.

A NEW WORLD ORDER?

NeXT's careful planning seems to be paying off. One product and a high-tech factory keep costs low. A careful qualification program for new dealers should avoid distribution problems. Relationships with strong local partners makes for localized decision-making and takes the strain off NeXT's own resources. The hallmarks of a successful multinational company — strategic interrelationships, strong products, and competitive prices — seem to be in place. ♦

DAN LAVIN is a senior editor at NEXTWORLD.

moving from Geneva, Switzerland, to Antibes, in the south of France, is headed by Theo Wegbrans, who previously headed up Hewlett-Packard's European operations. Since the European sales office was set up last year, NeXT's sales in the area have grown to account for up to 30 percent of total sales.

Wegbrans attributes NeXT's success in Europe to several factors, but key among them are the NeXT's UNIX operating system (attractive to Europeans who have been burned by past reliance on proprietary operating systems) and the fact that high-tech sales in Europe have been necessarily VAR-based from the start, due to a dearth of attention from computer manufacturers themselves. This created a large pool of dealers with extensive infrastructure in place, and the dealers, in the business of creating custom systems for their clients, were drawn to the NeXT's unique development environment.

NeXT's partner in Japan and Asia is Canon, which owns 16 percent of NeXT and is a well-established presence in the notoriously hard-to-crack Japanese market. Its sales branch, Canon Sales, is the largest computer distribution network in Japan. The top 200 of the 2000 Canon stores currently carry NeXT.

NeXT has important advantages over any other system for Japanese buyers. Perhaps the most important is NeXTstep 2.1J. This Japanese version of NeXTstep, released in May of this year, was the product of a joint development effort by NeXT and Canon that provides an innovative, unique answer to data-entry problems, posed by the large Japanese character set, that have stymied automation in Japan. A special text object in 2.1J provides on-the-fly Kanji-to-Kana translation (Kana is a phonetic version of Kanji devel-

FOR DIGITAL AUDIO,
NEXT'S HARDWARE IS
SHARP, BUT COMMERCIAL
SOFTWARE IS FLAT.

Paul Lansky, professor of music at Princeton University, calls the computer "the instrument of the imagination." A music pioneer from way back, Lansky once spent whole days trying to coax sound out of a mainframe. Now the abstract composer has recently released a CD of his compositions, *Smalltalk*, on New Albion records, the first commercial recording to be created entirely on a NeXT computer.

And if that mainframe was a violin for Lansky, the NeXT is a Stradivarius. With its speed, mass storage options, sound circuitry, and especially the Motorola DSP56001, the NeXT is ideally suited as a computer-based digital audio recording system.

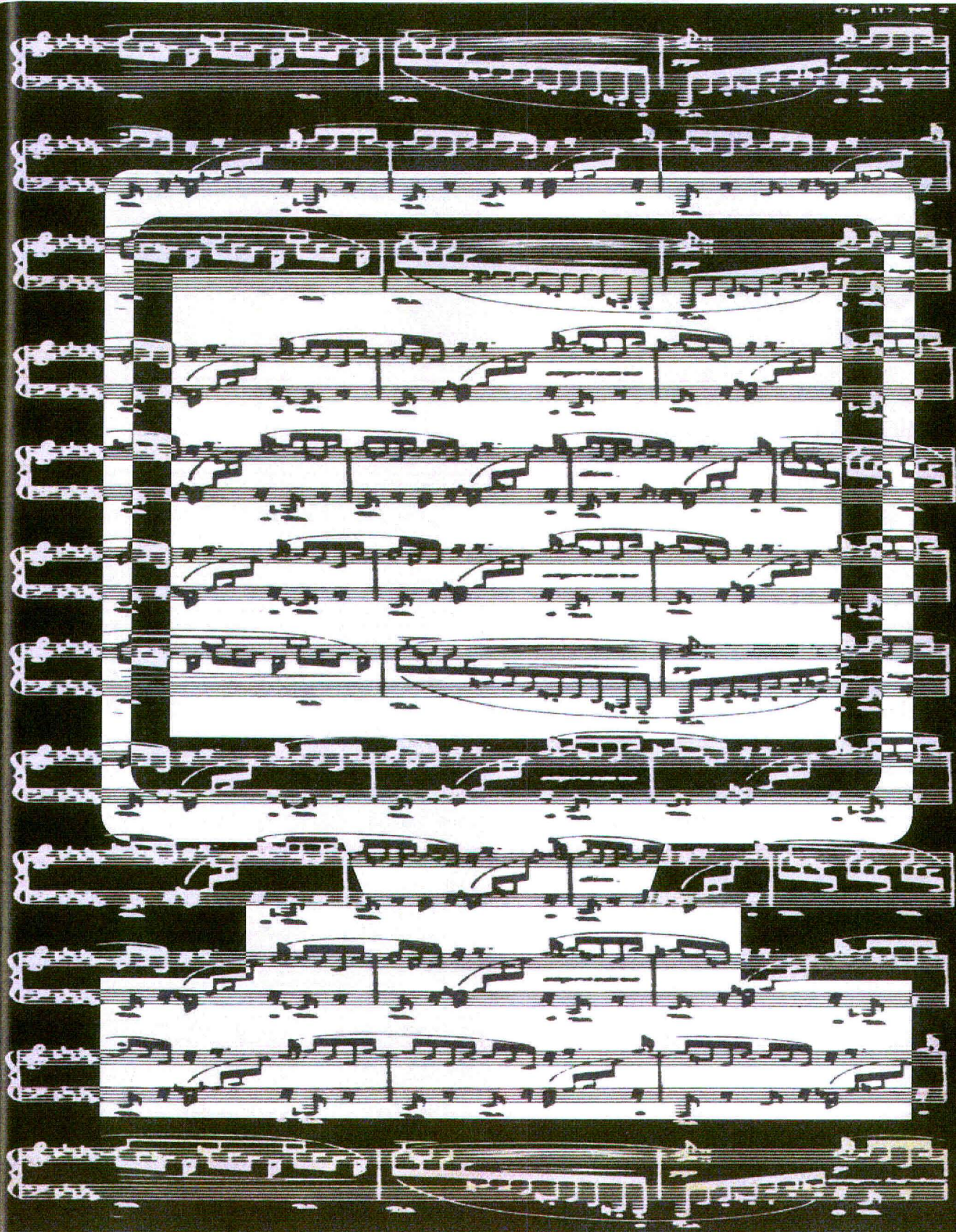
Until the arrival of the NeXTstation, musically capable desktop systems could run as high as \$20,000. But the NeXTstation, equipped with a

THE MUSIC BOX

small amount of additional hardware and software, brings CD-quality recording, playback, and mastering to the desktop for about \$5000, a price that even a musician can afford.

NeXT's musical ability is limited only by the lack of commercial music applications. Lansky is the type who will do whatever is required – including programming – to get the effects he's after. The same is true for two of his former students, Andy Milburn and Tom Hajdu, now in business as "tomandandy" (see the sidebar "NeXT on MTV"). They find that the NeXT's music programming tools are superior to those available on other desktop platforms. Less hardy souls, however, may be daunted by the shortage of software. ►

BY LEE SHERMAN



Introducing a new WordPerfect® for a revolutionary platform: WordPerfect for NeXT™ computers.

Taking full advantage of the NeXT environment, this is the first true "What-You-See-Is-What-You-Get" WordPerfect. Now, as you work on a document, you can see it in all of its glory—complete with headers, footers, graphics, and footnotes.

WORDPERFECT ANNOUNCES THE NEXT LEAP IN WORD PROCESSING.

In fact, the NeXT version of WordPerfect does away with the whole idea of "page previewing." You create each page with the confidence that every element is in place, exactly where it will print.

Having true WYSIWYG means every step in creating a document is easier. If you need multiple columns, you simply select that option and all your text quickly rearranges itself. (No problem creating columns of varying widths, either.)

To add graphics, all you have to do is use the mouse to drop the image file onto the page. Then, if you'd like to move it, you need only to drag the image to its new location on the page—once again, the type automatically rearranges itself.

Of course, it wouldn't be WordPerfect if it weren't WordPerfect to the core. Our NeXT version is compatible with versions running on other platforms, so you can move files easily between all machines.

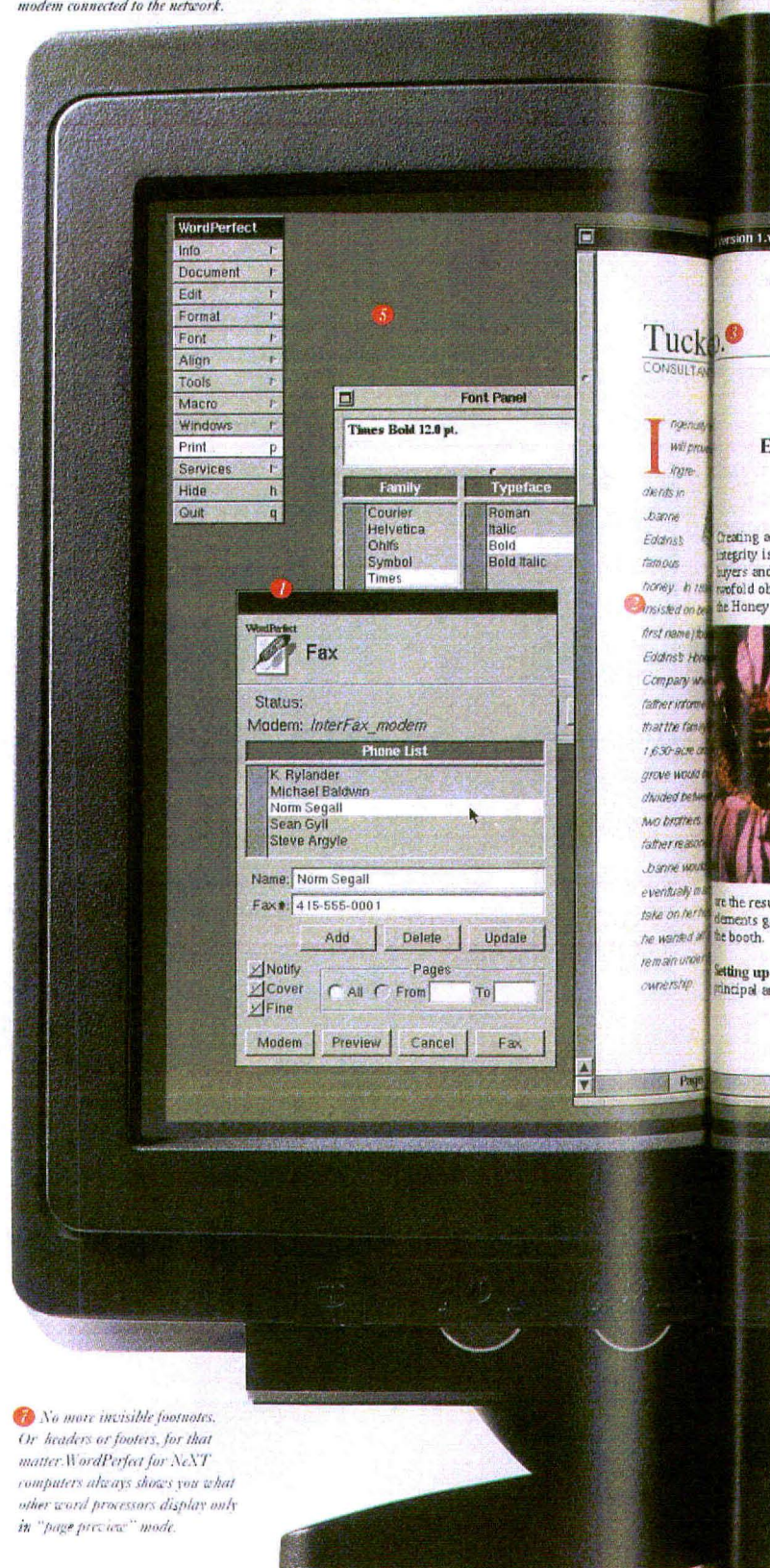
If you'd like more information, just call WordPerfect at (801) 225-5000. We think you'll agree that WordPerfect and NeXT computers represent another leap in word processing. Then again, from what we've seen in the world of NeXT, innovation seems to be the order of the day.

WordPerfect

1 Fax capability is built into every NeXT computer. So you can easily send a document directly from your screen to any fax machine on earth at 200 dpi resolution. All you need is a single fax-modem connected to the network.

2 Creating columns doesn't require any gymnastics. Just say how many you want and there they are—all easily adjustable for varying widths.

3 NeXT machines use Display PostScript to generate the screen image, so fonts are always sharp, no matter what the type size or degree of rotation.



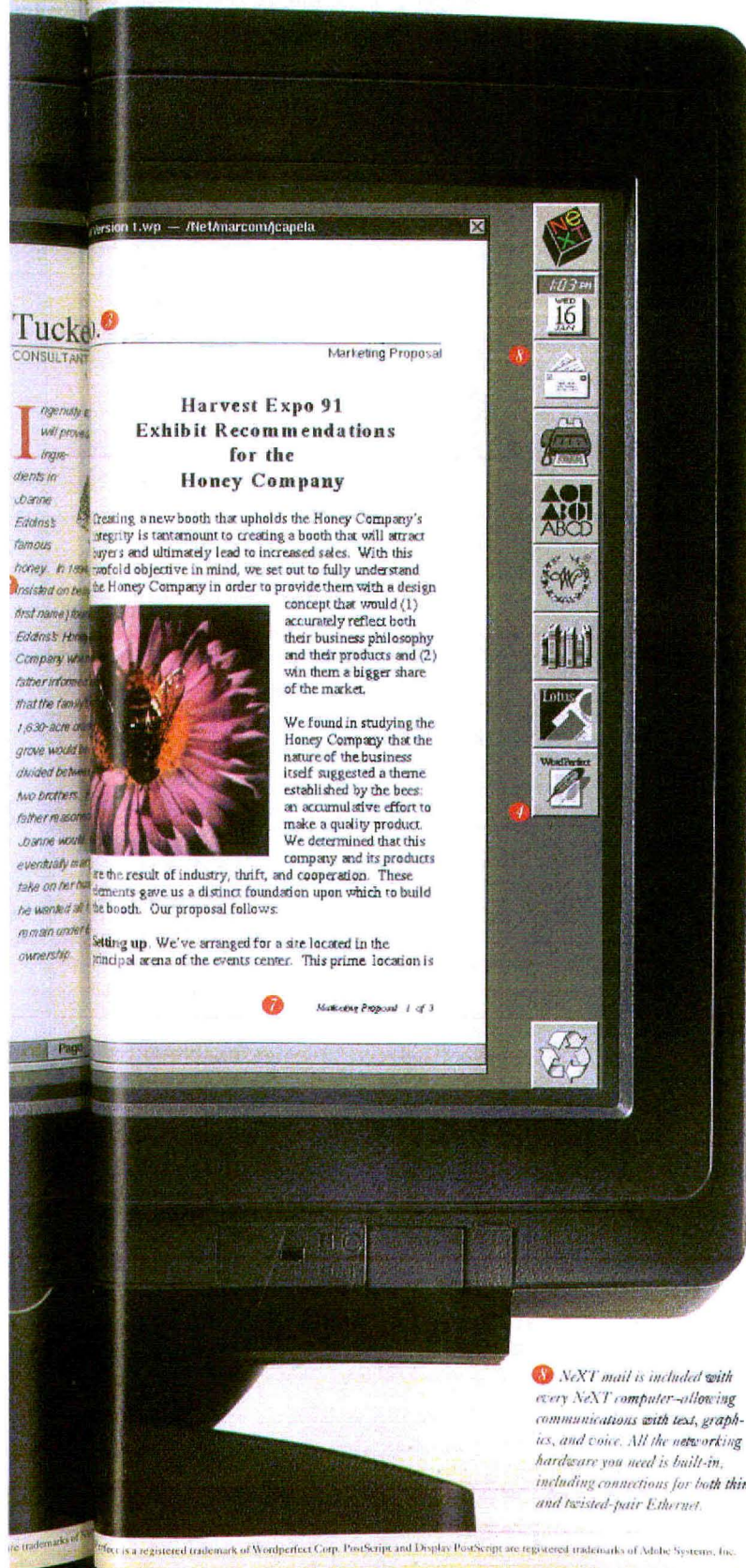
4 No more invisible footnotes. Or headers or footers, for that matter: WordPerfect for NeXT computers always shows you what other word processors display only in "page preview" mode.

se Display
the screen
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the NeXT world, the
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requently used applications.
multitasking, you can
of them at once—cutting and
as much as you want.

5 The NeXT MegaPixel 17"
Color Display gives you an image
that's remarkably rich and de-
tailed. It also gives you space to
view an entire document and still
have room for tools and panels.

6 To add graphics, just drag an
image file onto the page—not only
will the image appear, but type
automatically rearranges itself.
Moving an image is as simple as
clicking and dragging.



8 NeXT mail is included with
every NeXT computer—allowing
communications with text, graph-
ics, and voice. All the networking
hardware you need is built-in,
including connections for both thin
and twisted-pair Ethernet.

As WordPerfect discovered, there is one
machine perfect for WYSIWYG word process-
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But the truth is, the NeXTstation is a
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Because of the way it's been designed, true
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ensure that what you see on the screen is pre-
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NeXT machines also offer true multitask-
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When creating a document, for example, you
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As the first computer built to exploit
Motorola's revolutionary 68040 chip, the
NeXTstation delivers performance that's truly
inspiring. And with a price starting at \$4995,
Byte Magazine says it "may now be the indus-
try price/performance leader."

No argument here. Considering this one
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MB of memory, a 2.88 MB floppy disk drive, a
105 MB hard disk, and both twisted-pair and
thin Ethernet. Not to mention NeXTmail—
which lets you communicate using text,
graphics, and even your voice.

Call 1-800-848-NeXT for our
NeXTstation brochure. It marks a
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NEXT ON MTV

brought their NeXT-produced musical compositions and programming tools to the cable network, viewers have experienced their intricately textured, often chilling soundscapes accompanying many of MTV's flashy video graphics.

Hajdu and Milburn are partners in *tomandandy*, an award-winning music production company in New York. Much of their work, which also has appeared in consumer product advertising, is created with tools they've written for the NeXT.

"The NeXT is suited to our sort of crazy, programming-intensive world of creating music, which requires a powerful, flexible, and totally open-ended environment," explains Milburn. "This is a very cool way to make and mix a big stew of sounds."

One of the applications, *Clamshoe*, uses similar algorithms in an attempt to mimic an existing piece of music. "It fails miserably," says Milburn. "It's a real opportunity to change your relationship to what it is that your making and to stumble across stuff that you and your personal habits would keep you from coming across otherwise."

Another program, *Squid*, digs through the many hours of sound resident on the computer at any given time, attempting to create a new composition based on artificial-intelligence pattern-matching algorithms. The user can adjust sliders to try to influence the outcome of the program, but again the controls are at best vague and purposely counterintuitive.

Hajdu and Milburn first collaborated in 1986 while graduate students of composition at Princeton University, where they first began to develop the electronic soundbites that have become their trademark.

"We discovered our pieces were getting extremely small, extending from about 8 to 20 seconds in length," says Milburn.

"Somehow it seemed inappropriate to do 25-minute epic works when what we wanted to say could be said in ten seconds," explains Hajdu. "Instead of generating a long, overarching narrative composition, the

You don't hear just heavy metal on MTV these days. Since Tom Hajdu and Andy Milburn

sound we made was a blast of experience."

Armed with a recorded compilation of 15-second pieces and a plan, Hajdu and Milburn went to MTV headquarters. "We thought the pieces would work really well as scores exploding beneath the MTV logo. It's fifteen seconds long and has a constant influx of weird, racy computer graphics, but always uses the slash rock guitar thing underneath it," says Milburn.

At first, MTV's promotions department was somewhat bewildered, but they soon found a use for *tomandandy*'s work. "They gave us a big pile of records for soon-to-be-released videos and asked us to cut them up and do something unusual for a promotional spot," explains Milburn. The result was *BUZZ*, MTV's cutting-edge video series of 13 half-hour segments.

Following that initial break, Hajdu and Milburn have won a Broadcasting Design Award for their score of an MTV video package promoting global music and scored numerous commercials, including works for Converse All-Stars, Mercedes-Benz, Sony, and Fujicolor.

While crediting the NeXT for the flexibility necessary to prod their creativity, the two admit some frustration at the lack of professional-level commercial software for the platform. "We have to use rather primitive, almost hilarious methods when we apply sound to film," says Milburn. Because SMPTE doesn't figure into the NeXT universe yet, Hajdu and Milburn describe their synching system as "watching the video and hitting Go."

"In some ways, what we do is actually more difficult on the NeXT platform," says Milburn. "Few sound applications are available, so composers are forced to develop their own programs." Hajdu concludes with guarded optimism: "NeXT was smart enough to make the machines and hopefully to engage the right people [to provide software for] them."

"Our music is conceived in very visual ways and tends to be kind of frightening, a little too scary for most mainstream television," says Milburn, "but it marries well to twisted, chaotic video."



tomandandy uses the NeXT to create cutting-edge audio effects.

BY LEE SHERMAN AND
CATHERINE PAVLOV

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TAKING MUSIC SERIOUSLY

The Macintosh and Amiga computers have become standards in the music community. Both machines come equipped with sound chips capable of acting as four-voice synthesizers, while the Amiga also offers multitasking. Such sound support has been the best available at an affordable price, and because of that, a wide range of commercial applications have been built around these two platforms. However, according to Lansky those computers are not up to the standards of professional use.

"NeXT was the first computer to take sound seriously," says Lansky. "The Mac and the Amiga both had 8-bit digital-to-analog (D/A) convertors, which gives you a decibel range of around 48 db — about what you get on an average cassette deck. The NeXT has 16-bit D/A convertors for a decibel range of about 90 db, the same as a CD player. Using the other machines was like painting in black and white instead of color."

Providing better sound quality was an obvious, evolutionary step. But including building blocks for music applications, such as NeXT's bundled Sound Kit and Music Kit, was revolutionary. NeXTstep supplies tools for musical synthesis, composition, and performance, as well as the recording, playback, and editing of sound. Like all of NeXT's development tools, these provide objects that make software development easy and ensure consistent interfaces.

What the NeXT doesn't offer — yet — are commercial-level hooks into MIDI (Musical Instrument Digital Interface), the standard around which digital music has taken shape. While MIDI devices can hook into the NeXT through its serial port via a separate MIDI interface, it lacks a real MIDI port

— a feature found even in the entry-level Atari ST.

The NeXT's operating system includes a MIDI driver (the version in NeXTstep Release 2.0 replaces a flawed implementation in the first release) and a MIDI object that can be used to communicate with a MIDI synthesizer through the computer's serial port. Any MIDI interface that conforms to the RS-232 or RS-423 standards (including Opcode's Studio 3, developed for the Macintosh) should work with the '040 NeXT machines.

The other drawback is the lack of commercial software applications for music. Previously announced projects, such as the MIDI editors MusicProse and Performer, have been put on hold. For right now, musicians must also become programmers in order to use the NeXT.

The first glimmerings of commercial music software can be seen in multimedia authoring environments with advanced music capabilities, such as MediaStation from Imagine, which includes sound recording and editing capabilities designed for synchronizing sound with other multimedia events. First Chair, due from Imagine next year, is expected to combine similar support for sound with MIDI sequencing. HyperCube, a HyperCard-like tool expected this winter from Thoughtful Software, will include MIDI support.

While ready-made MIDI products for the NeXT are scarce, some gaps are filled and some interesting examples are provided by the developer demos that come with the NeXTstep operating system. One of these, Ensemble, provides an especially able example of the type of functionality available through the Music Kit. Ensemble combines tools for real-time digital synthesis, algorithmic composition, and MIDI playback and recording.

Ensemble is designed to be controlled through an external MIDI

device, such as an external keyboard or sequencer. It enables a performer to manipulate MIDI input in real time, adjust instrument parameters, and save the new orchestration to disk. It also includes a variety of algorithms for generating automatic music, similar to those found in commercial applications such as M for the Mac and Atari and MusicMouse for the Mac. It also is one of the few applications available for the NeXT that reads and writes standard MIDI files, which makes it possible to use Ensemble as a simple sequencer.

Another demo, ScorePlayer, is similar to programs like ConcertWare for the Mac, which synthesizes music in real time through the use of a score file. In contrast to the relatively crude four-voice synthesizers common on other machines, the NeXT's DSP produces music that is astonishingly rich. The NeXT also features a command-line utility, called convertscore, that lets you convert standard MIDI files into score files that can be used with ScorePlayer or a similar program.

NOISE FROM OUTSIDE

The NeXT includes direct support for two sampling rates: 22.05KHz and 44.1KHz. The circuitry that processes all sound-related I/O is in the MegaPixel Display or, in color systems, in the Sound Box. The video cable transfers sound information from the motherboard to a 16-bit, 2-channel D/A convertor that translates the information into audible stereo sound. The system also includes an 8KHz CODEC chip for analog-to-digital (A/D) conversion.

If your system has a microphone (either the built-in one on the newer machines or one purchased for an older cube), you can use SoundPlayer to record telephone-quality, 22.05KHz sound, but musicians will want something better.

Digital Ears from Metaresearch allows you to record CD-quality audio directly to disk. It plugs directly into the NeXT's DSP port. Digital Ears includes its own software, an easy-to-use program called SoundWorks, for editing and applying effects to your samples. Professional musicians will miss the lack of support for MIDI and SMPTE, but SoundWorks provides most of the tools required for sculpting sound.

Ariel Corporation's DM-N Digital Microphone takes a slightly different approach. It puts a pair of 16-bit A/D convertors inside a microphone, allowing the user to record at a variety of sampling rates, including 5.5125, 11.025, 22.05, 44.1, and 88.2KHz. It also includes inputs for recording from external analog sources. No software is included with the digitizer, but you can use it with SoundWorks, which can be purchased separately from Metaresearch.

In order to synthesize, process, and mix sounds simultaneously, musicians need multiprocessing systems. For such applications, Ariel's QuintProcessor combines five Motorola 56001 chips on a single board that installs into a NeXTBus slot on a NeXT cube. One of the processors serves as the communication hub for the board.

The A/D64x from Singular Solutions extends the signal-processing capabilities of the NeXT by allowing simultaneous A/D input (with sampling rates of 32, 44.1, and 48KHz) and digital output. Like Digital Ears, the A/D64x connects to the DSP port and comes with software for recording, playback, and editing of waveforms.

Dazzl, a manufacturer of high-end A/D convertors used in data acquisition, is making its first foray into the music world with the Zydeco Audio Board, a multi-channel digital audio processor

THE NEXT'S SOUND KIT

Motorola 56001 DSP provides real time digital synthesis of sound and music.

Built-in CODEC microphone and analog-to-digital converter allows for voice quality recording at 22KHz.

CD-quality stereo output (44.1KHz, 16-bit two-channel digital audio).

Built-in speaker, stereo headphone jack and line-out jacks for connecting to an audio system.

Unified PostScript imaging system for publishable quality sheet music.

Mass-storage options such as large capacity hard disks and removable optical disks ease the pain of storing large samples.

Bundled software includes several fully functional demo applications that include an oscilloscope and spectrum analyzer.

The Sound Kit, a set of software routines included in the object-oriented

NeXTstep development environment that provides all you need to record, edit, and playback sampled sound.

The Music Kit, more routines for synthesizing sounds, composing, and performing music.

GLOSSARY

DSP Digital Signal Processor, a specialized computer chip that is capable of performing real-time music synthesis and producing CD-quality audio.

MIDI Musical Instrument Digital Interface, a device-independent language, understood by MIDI-equipped devices like synthesizers, sequencers, and drum machines, which allows them to communicate both with each other and with computers.

MIDI Driver System-level software, similar to a printer driver that provides for communication between the operating system and an external MIDI device.

Sampler A hardware device that converts analog sound into digital sound, making it suitable for manipulation within a computer.

Score file A file containing a representation of the notes in a piece, along with information about pitch, frequency, and tempo.

Sequencer Hardware or software that records the "events" of a musical performance rather than the actual sounds produced.

SMPTE A time-code standard developed by the Society of Motion Picture and Television Engineers that allows for precise synchronization between a sequencer and a tape recorder.

Synthesizer A hardware device that uses internal sound circuitry to create sounds.

with on-board sequencing that could replace dedicated computer synthesizers. The low-end model can sample eight channels at 44.1KHz or four channels at 88.2KHz and takes advantage of the NeXTcube's on-board D/A convertor. The board will soon also be available in a high-end configuration that will add additional channels, as well as tools for manipulating the characteristics of the sound, such as real-time parametric equalization, non-destructive editing, and programmable digital filtering.

BEYOND MIDI

Although discussions of electronic music tend to center on MIDI, it's important to remember that MIDI operates within just one part of the world of electronic music: computer control of external instruments. But the capabilities of the NeXT have the potential to take it far beyond a role as controller and into competition with synthesizers themselves.

"I think what you're going to see in the next five years is machines like the NeXT machine emulating any synthesizer on the market," says Lansky. "Synthesizers will be obsolete; you'll be able to do everything in software."

The NeXT's DSP, which can synthesize music on the fly, and the NeXT's ability to handle an unlimited number of events and channels ensure that the NeXT is well positioned to take advantage of the next wave in electronic music. And as the realms of commercial and electronic music increasingly overlap, that moves the NeXT practically into the mainstream. ♦

BUYER'S GUIDE

A/D64x

\$1295. Singular Solutions, 959 E. Colorado Blvd., Pasadena, CA 91106. 818/792-9567

Digital Ears and SoundWorks

\$795; \$395 for SoundWorks separately. Metaresearch, 516 S.E. Morrison St., Ste. M1, Portland, OR 97214. 503/238-5728

DM-N Digital Microphone and QuintProcessor

Digital Microphone \$595, Quint Processor \$700. Ariel Corporation, 433 River Rd., Highland Park, NJ 08904. 908/249-2900; 908/249-2123 fax

HyperCube

\$495. Thoughtful Software, 616 E. Locust St., Fort Collins, CO 80524. 303/221-4596

MediaStation

\$995 for single user; \$3999 for up to 5 users; \$11,999 for up to 20 users. Imagine, 32 N. Washington St. #14, Ypsilanti, MI 48197. 313/487-7117; 313/487-1323 fax

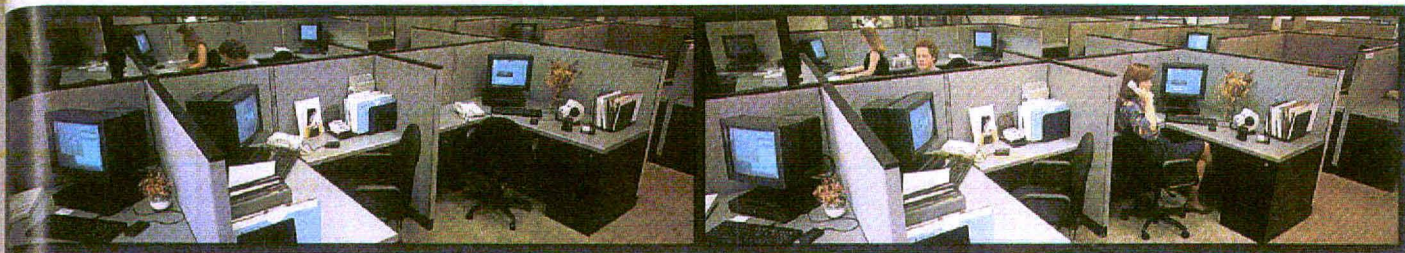
Smalltalk

\$15 (CD only). New Albion Records, 584 Castro St. #515, San Francisco, CA 94114. 415/621-5757; 415/621-4711 fax

Zydeco Audio Board

\$5000 for Zydeco I; \$9000 for Zydeco II. Dazzl, 1203 N. Bourland Ave., Peoria, IL 61606. 309/674-9317; 309/674-9122 fax

LEE SHERMAN is a writer and NeXT developer specializing in music and multimedia.

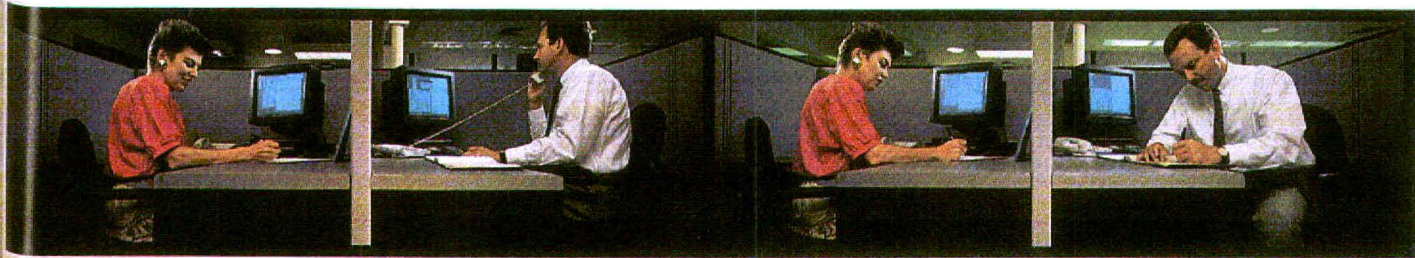


F A S T S E L L



UPSTART REALTOR GOES UPSCALE WITH BIG NEXT PLANS.

BY JONATHAN LITTMAN



PHOTOGRAPHY BY MARK TUSCHMAN

Pastorino wasn't impressed with most of the computer systems. "There was no emotion. It was like going out and getting your tires rotated."

Breaking into the lucrative and competitive south Silicon Valley real estate market is not an easy proposition. So when Helen Pastorino, an executive at one of the leading firms in the area, joined upstart Alain Pinel Realtors in Saratoga, California, she looked for every advantage she could get.

To make a splash in the market, Alain Pinel had to offer significantly better service to customers than the competition. Pastorino was savvy enough to realize that the right computer system was a strategic element in delivering outstanding service and managing the operations of the company. She was also prepared to spend heavily for the right system. Backed by substantial funding from private investors, Alain Pinel's strategy was to spend its way to a dominant position in the South Bay luxury home market.

After a frustrating search, Pastorino discovered the NeXT. In June, a gala opening was held for the showcase Alain Pinel office in Los Gatos, California. Center stage were 65 NeXT systems and an elegant suite of

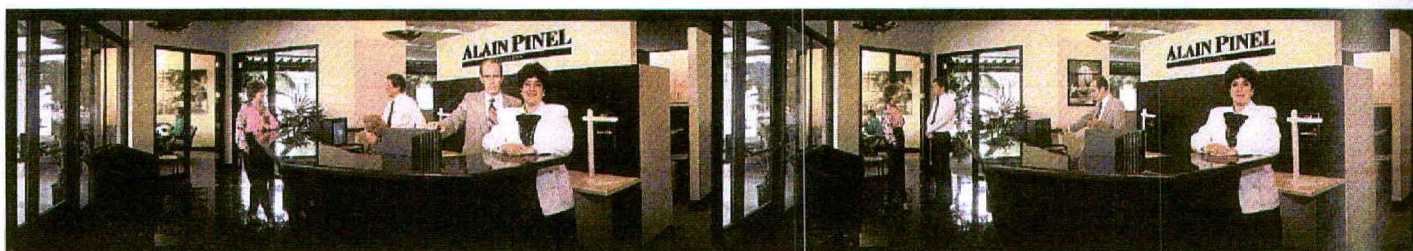
and then it wouldn't work."

She had no more time to waste. In two months, when the doors were scheduled to open at the Los Gatos office, she wanted a workstation on every agent's desk. Accustomed to the swift cycles of her business, where multimillion dollar sales are frequently made in days, Pastorino planned to move quickly.

She considered all the major brands. "There was no emotion," she says. "It was like going out and getting your tires rotated." Nor did the parade of salespeople from IBM, Hewlett-Packard, Sun, Apple, and others that trooped through her office make one box stand out from the others.

IBM sent a salesman who specialized in real estate, but Pastorino wasn't impressed with his industry knowledge. During the Apple sales call, she wasn't able to get references for real estate offices networked with Macs.

Two companies that did better were Sun and Novell. Pastorino was impressed by the long list of network installations volunteered by both



office automation tools that featured telecommunications, graphics, and management software.

The installation is the beginning of what promises to develop into an impressive "virtual network" of five offices and over 300 machines. In a few short months, Alain Pinel may have become one of the most technologically advanced realtors in the world.

The search

Though computers are relatively new to real estate, Alain Pinel's needs were typical of firms looking for professional workstations. Real estate agents need custom software to extract information from distant databases and create a variety of reports. They need software that helps them juggle and document phone calls to clients, lenders, and a variety of vendors. And management needs to generate snapshot reports on sales and operations.

Although it was software that would make the difference, Pastorino began by shopping for hardware.

She had learned from one early mistake. Pastorino's first taste of technology had been disastrous: A year earlier, when she had launched her firm's Saratoga office, she had installed a large PC network powered by 80386 clones. Her objective had been to reduce time wasted in everyday tasks, but there were constant bugs and crashes. "It was a nightmare," says Pastorino. "I had no idea I'd spend \$180,000

companies, and it seemed clear that Novell could deliver the lowest price, at \$2000 to \$3000 per workstation. Sun moved quickly, sending a supervisor armed with information on vertical markets.

All in the family

At first, NeXT wasn't in the running. With just weeks to go before her decision date, Pastorino's husband, Mark Richards, then a marketing executive at Pixar, convinced her to look at NeXT.

She started with an informal discussion with one of Richards's friends who was an engineer at NeXT. They talked about software. Pastorino said she'd been impressed by a *Harvard Business Review* article about an executive who could generate reports on any part of his business at a moment's notice. The friend said that the NeXT development environment was ideal for such executive information systems.

There was another thing about NeXT that appealed to Pastorino: its design. Cosmetics may seem like a trivial matter, but in the first-impression world of exclusive real estate it is an important consideration. The Los Gatos office was to be a showcase. Outfitting the office with sleek black machines would only enhance the exciting interior design.

But NeXT's sales team was little better than those she'd met from other vendors. It took a week for a sales team to arrive from NeXT, and they weren't well prepared. "I got the sense they didn't care about my business," says Pastorino. "They were indulging me."



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Founded:
Employee:
Hardware:
Software:



They also didn't believe she was a serious buyer. As soon as Pastorino asked about financing, "they told me I couldn't afford it," she recalls incredulously. The NeXT representatives left abruptly, and a stunned Pastorino realized she still hadn't seen the machine.

That could have been the end of the story, except for one last intervention by Richards. He had noticed an ad for customization by a small software company called Adamation and convinced Pastorino to call them up. When she talked with Stephan Adams, the company's energetic president, she at last found someone who seemed to understand her needs.

She decided to make the short drive to Adamation's office in a rough neighborhood of Oakland. "I didn't want to park my car, but I liked it," she recalls. Pastorino squeezed through the bars on the street entrance and made her way up into Adamation's unique loft office, past boxes from a video producer and art-in-progress, to an unlikely oasis of NeXT machines.

Finally getting her first look at the machine, she admits she still didn't "get it," but she did like Adams. He seemed to care about her concerns. "It started to get less technical and became a relationship with people," she says. "I started to realize the software was more important. I was looking at hardware when I should have looked at software."

The closer

After the visit with Stephan Adams, Pastorino asked Sun representatives

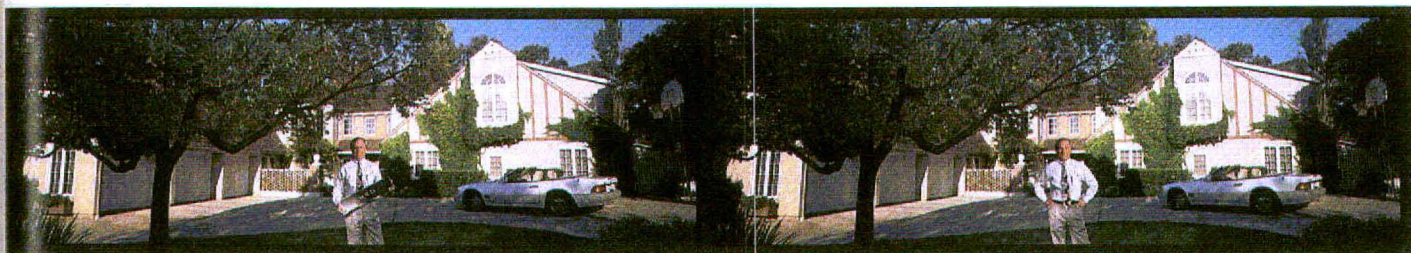
Stephan Adams that when Pixar scaled back its operations he joined the small software team. His first big sales challenge: his wife.

A sale that began as a search for the right box had become a search for the right software partner. Suddenly, the final consideration in the sale – the roughly \$300,000 price tag for 60-plus NeXT machines – wasn't an impossibly high number. "My biggest concern wasn't about the hardware," says Pastorino. "It was that if I went with some other machine I'd pay half a million or more for the software and find out it didn't work."

In the end, it was not only Stephan Adams and her own husband, but the other Steve that inspired Pastorino to sign on the dotted line. After a second, technical meeting with NeXT failed to convince her to buy, Jobs himself made an appearance. "He did a fabulous demo," she says, seeing the full potential of NeXT for the first time. "I could feel his commitment and energy behind the technology."

During the meeting, Pastorino and Jobs talked dollars. Buying an office full of computers is not unlike buying a property, and she hoped to find a buyer's market. She felt her relatively big order and turbulent sales experience should earn her some discount.

But she found Jobs to be firm on pricing. "Do you want dollars for your pain, or do you want to do what's right for your company?" he asked her. She decided he was right. "I couldn't get what he had somewhere else," she says.



how long it would take to write the custom real estate software that she needed. One to two years, they said. Novell gave her the name of a company that would do the work, but when she called, they said they could only put her on a waiting list. And nobody seemed to know what it would cost.

Stephan Adams and his brother William did. They had done similar custom work for William Morris's major NeXT installation (see "Profile: The Star System," *NeXTWORLD* April 1991), and the ambitious seven-person firm was small enough to move quickly. The Adamases hashed out a deal with Pastorino to develop five real estate modules. Pastorino thought the initial \$100,000 fee was high, but then she wasn't giving them much breathing space: She wanted working copies in 45 days. "She was putting in the machines on a set date," says Adams. "It was a true test of our tools. And NeXT's."

It was also a test of a marriage. Mark Richards was so impressed by

The installation

The breakneck pace Alain Pinel displayed in evaluating NeXT hasn't slowed a bit since the mid-May installation. The NeXTstations are arrayed on every desk in the elegant offices. Three servers are safely ensconced in the company bank vault (Alain Pinel's offices are located in a former savings and loan).

Ask the realtors how much RAM or how many megabytes the machines have and they shake their heads. But ask them what benefits they've seen in Adamation's custom multiple-listing software and they can't stop talking. The focus remains on solutions.

The contrast between the average real estate firm and Alain Pinel is dramatic. At most real estate firms, agents have to arrive early in the morning to get time on cumbersome, screenless systems that dial into listing services. We've all seen the dismal results: standard, cheap computer printouts. To do comparative listings agents often get out the scissors to cut and paste.

NeXT User Profile

Company: Alain Pinel Realtors, Los Gatos, California

Business: Luxury home realtor

Founded: 1990

Employees: 67

Hardware: 62 NeXTstations and 3 NeXT cubes; 5 NeXT printers; modems; scanners.

Software: Adamation's Who's Calling?, In/Out messaging software, Custom MLS and CMA real estate

applications, NeXTmail, WriteNow.

Purchase cycle: Two months.

Costs: Estimated \$300,000 – \$350,000 for hardware; \$100,000 initial fee for custom software.

Immediate goal: Speed access to realty boards, customize reports, reduce response times on client inquiries, improve inter-agent communications.

Long-range goal: Convince business partners to use NeXT in order to eliminate redundant paperwork, create snapshot management reports, and link new offices in a "virtual network."

Pinel is encouraging business partners to computerize with them. It's big enough to say, "If you want to work with us, you have to be on-line."

At Alain Pinel, agents don't have to leave their desks when a client calls. Through custom multiple-listing software provided by Adamation, agents can do searches on a range of properties (through a pool of ten 2400-baud modems accessible from anywhere on the network) and generate high-quality, printed reports from any of five NeXT laser printers in a few minutes. While the reports are printing, agents document the phone call in Adamation's Who's Calling?, beginning a running record on the client. To do a comparative listing report, agents simply run properties generated from the MLS module through a separate comparative module.

Photographs of new listings are scanned (on an HSD scanner) into the NeXT. An electronic message circulates along with the scanned image, detailing the property. By August, the firm expected that Metro Scan maps and county data currently available on CD-ROM would be used to print maps for clients that detail listed properties and information about neighborhoods. The data will also be used to inform neighbors when an Alain Pinel property is being sold in their area.

Previously, when agents had a new listing or wanted to share information with the rest of the firm, they typed up a sheet, copied it 60 times, and placed it in each mailbox. E-mail eliminates that wasted time and offers new opportunities. Agents post e-mail about references for business or services they need to serve their clients. "Someone had a client that needed a refrigerator," says Alain Pinel realtor Midge Moser. Once a refrigerator was found, a van was sold through e-mail for the same client. Sums up Moser: "We have more time to provide service."

But Adamation's real-time messaging software is taking agents beyond e-mail. In/Out messaging software enables agents to record when they will be in and where they can be reached. When the secretaries receive calls they scan the In/Out directory and write a quick message telling the agent who is on the line. "With this, they press Return, and in under a second the message is there," says William Adams, the software's designer.

If a new client calls and remembers only part of an address from a newspaper ad, agents can search a custom, in-house database to pull up the property listing. Agents also sign up on the NeXT to show properties. The data is later used to generate weekly reports. It's the kind of instant-snapshot management that Pastorino hopes to expand.

Links to suppliers

This sounds like a lot for a firm that has had its NeXTs only a short time, but it's only the beginning. Pastorino surprised NeXT by how quickly she was prepared to adopt new technology. Now she's surprising her independent business partners, including mortgage houses and title companies. "We're pressuring them to computerize with us," says Pastorino. Explains Stephan Adams: "She's big enough to say, 'If you want to work with me, you have to be on-line.'"

Pastorino is prodding the companies to install at least one NeXT. Once the connections are complete, loan information will be electronically passed between the independent companies, reducing redundant efforts and automating the cumbersome paperwork flow.



"Competition is so tough, you have to get your edge in increments," says Pastorino. "Lenders, mortgage houses, termite companies, they're all perceived to be the same. This is one of the last frontiers on which to make a difference." The strategy seems to be working. At this writing, Alain Pinel's marketing firm was considering purchasing a NeXT, and its wholesale lender had met with Jobs.

But Pastorino isn't waiting around for anyone. Just two months after the Los Gatos office received its first 60 NeXTs, the Saratoga office was scheduled to be purged of its defective PC network, outfitted with 65 NeXTs, and linked to Los Gatos. "As a company grows, you lose the culture of the firm," she says. "I don't want that to happen. I want people to feel they're all in the same building."

In late June, the firm was debating whether the offices needed leased lines or could make do with dial-up. If all goes as planned, Pastorino hopes to expand her "virtual network" to 300 machines in new offices scheduled to open in Los Altos, Palo Alto, and Menlo Park.

Pastorino says that Alain Pinel is the first real estate firm to adopt advanced technology. "Clients go nuts when they see our machines - and they see what the machines can do." And what about the competition? "CEOs and presidents [of other realty companies] know we've opened a Pandora's box," says Pastorino. "They would have liked to have kept that box closed."

NeXTWORLD periodically chronicles the experiences of major NeXT customers. Future real-time case studies will include follow-up reports on previous subjects.

JONATHAN LITTMAN is a San Rafael, California, writer. His article about NeXTs on Wall Street appeared in the Fall 1991 issue of NeXTWORLD.

Solution to crossword on page 8.

REAVE	PEP	RGB	SAPS
ANTIC	POPE	ANC	UNIT
FORTHER	ESTOFUS	MINI	
TWARED	TORN	TATER	
OLGA	MEREMORTALS		
ADF	OED	LUCIFER	
BRAINDEAD	SHL	KANJII	
BARN	NO	HOLE	OEM
ABODE	TOTE	ATLANTA	
INSANELY	GREAT		
PARADOX	SAID	SARAH	
EMU	BITS	RN	RARA
DIRAC	COO	NOBRAINER	
CLEARLY	FEEL	DAD	
BESTOFBREED	GULF		
EVERY	MAIA	SOLACE	
SALE	CHANGETH	WORLD	
IDES	FSP	ETON	EGGON
CESS	ODS	RSM	DARPA

Math for the Masses

Mathematica 2.0 adds aural output and a compiler to its sophisticated modeling tools

by BRUCE BERKOFF

Since the ancient Greeks stood around drawing pictures in the sand, humans have always tried to visualize mathematical concepts. Having computers to solve simultaneous equations was a big leap forward in man's effort to understand mathematical concepts. Mathematica 1.0, a personal computer tool that could display them visually, was another huge stride.

Now, Mathematica 2.0 adds to that powerful visualization kit in yet another sense: It plays the aural equivalents. The innovative sound feature is just one of version 2.0's significant improvements, and that's saying a lot. Such an ambitious program is bound to have a few shortcomings, but overall, Mathematica is an excellent tool across a wide range of applications.

The most obvious uses for Mathematica lie in math education and scientific and engineering research. However, users can be found in any field that requires mathematical analysis, including many business applications. Mathematica is a full symbolic and numeric calculator, a graphical analysis and display package, a high-level programming language, and many other things—all written with the expressed goal of "doing mathematics by computer." Mathematica's interactive front end is based on how scientists do math—

from logical step to logical step—backed up by a powerful programming environment. Its introduction caused a revolution in the way math was done and an explosion of discovery never possible before. The program is now available on more than 20 platforms, from Macintoshes and DOS machines to supercomputers.

Mathematica has a long history on the NeXT. The program's 1.0 release was shipped as bundled software with NeXT's initial operating system; 1.0 customers will receive Mathematica 2.0 for free. (Mathematica will still be bundled free to NeXT's higher education customers, but commercial customers must pay \$1495.) Although there are other programs for performing symbolic mathematical manipulations (such as MACSYMA, developed at MIT in the early 1980s), none match Mathematica's ease for working with both numbers and symbols, as well as for integrating math, graphs, and now, sound.

Researcher's notebook

On the NeXT and several other platforms, Mathematica has an innovative front end called the Mathematica Notebook. The notebook includes editing tools that allow you to mix text, calculations, and graphics in a collapsible outline format similar to that used in many

word processors. As a result, users can organize sets of commands into groups and expand the parts they want to learn about. Many universities are taking advantage of this structure to develop interactively taught classes. In a calculus course at the University of Illinois at Urbana-Champaign, for example, students use Mathematica to explore and discover concepts while the professor concentrates on demos and lab instruction.

The notebook front end varies from platform to platform, whereas the kernel remains essentially the same. The NeXT front end could be used to run Mathematica calculations on a Cray kernel, for example, or to pipe results to and from more traditional programming languages, such as C or Fortran. This is a big plus for those in mixed computing environments, allowing work to be done on any machine that is currently available or best suited to the task at hand.

The 2.0 release also allows multiple kernels to be started from within one notebook (for background calculations) and has vastly improved and expanded error messages and suggestions. It even places the cursor at the spot of a misplaced bracket, although it fails to do so at the location of spelling errors it recognizes and warns you about.

In release 2.0, the notebook front end includes an expanded set

of text manipulation features, electronic publishing extensions that make it possible to create entire books within the environment. These books include sound, animated mathematical images, and full text. They collapse and expand at will, allowing the reader random access to contents of the book in a hypertext-like manner. The entire contents of *Exploring Mathematics with Mathematica* (Addison Wesley, 1991), by Theodore Gray and Jerry Glynn, is a Mathematica notebook; the electronic version is provided on CD-ROM with the paper book.

This new release also adds support for popular text, graphics, and sound standards, allowing the user to export and import of data from other programs. This is achieved through MathLink, a companion program. Wolfram envisions sophisticated Mathematica front and back ends to applications like CAD and spreadsheets.

Sound reasons

Mathematica now includes the ability to use the NeXT machine's CD-quality sound, a revolutionary approach that adds an entirely new avenue for finding patterns in data. Just as high-resolution color can add a new dimension to one's understanding of the graphical representation of a complex surface, high-quality sound allows for new insight into some functional displays. (In nuclear magnetic resonance spectroscopy, for example, we often record signals that just happen to oscillate within the audible frequency range (0 to 20KHz). Early on, experimentalists realized the utility of hooking up a speaker just after the preamp to hear the "ringing" of the coil, just to make sure things sounded okay.) This new Mathematica feature will doubtless clarify the connections between the aural and graphical.

Mathematica 2.0 also includes less revolutionary, but nonetheless

Mathematica 2.0

A unique tool for exploring mathematical concepts through text, graphic, and sound output. Mathematica 1.0 revolutionized the way people used computers to do mathematics, and 2.0's new features, including a way to hear functions, should extend this success. The program is available on a wide variety of platforms—a big plus—but it is unfortunately saddled by a non-standard mathematical notation scheme and copy protection.

\$1495 for business; bundled with NeXTstep 2.0 for higher education NeXT buyers

Wolfram Research, 100 Trade Center Dr. Champaign IL 61820, 217/398-0700

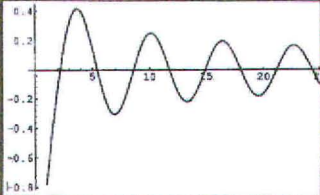
Using Mathematica

Mathematica can be your ultimate calculator, allowing you to perform simple arithmetic as well as complex numerical calculations that would be arduous, if not impossible, to do otherwise. Type $17+6*7$ into Mathematica (and press Enter, not Return) and the program prints "59."

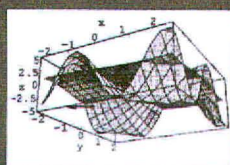
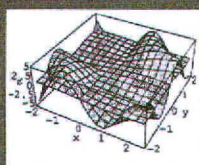
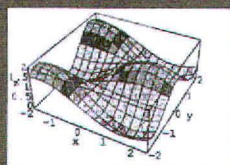
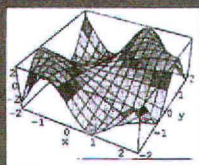
Mathematica lets you get approximate numerical results as well. Typing $N[3^{51}, 17]$ shows the first 17 significant figures of 3^{51} ($2.1536939630755578 \times 10^{24}$). One bug: If you use a number less than 17, you get the default setting of 5 digits.

Suppose you wanted to factor a large integer, like your favorite phone number and still have time for lunch: `FactorInteger[14153660900]` returns the values $\{2, 2\}, \{5, 2\}, \{109, 1\}, \{281, 1\}, \{4621, 1\}$, in less than a second.

Graphing complex functions is also a snap. Just type `Plot[BesselY[1,x],[x,1,25]]` to get this result:



More complex graphs are now available with the `Show[]` command, which has been extended to produce 3D plots. `Plot3D[3*Sin[x*y],[x,-2,2.5],[y,-2,2], AxesLabel->{"x","y","z"}, ColorFunction-> Hue]` yields the top left graph below, while `Plot3D[(1+Sin[x] * Cos[2 y]),[x,-2,2.5],[y,-2,2], AxesLabel->{"x","y","z"}, ColorFunction-> Hue]` yields the top right graph:

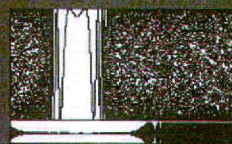
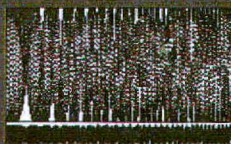


Typing `Show[%, %]` combines the two plots using the default shading (the bottom left graph). To display the graph from a different viewpoint, try `Show[%, %, ViewPoint->{1.3,-2.4,-1}]` (bottom right).

Although it's easy to get a variety of interesting viewpoints, Mathematica has no simple way to invert the view away from the origin.

I can scarcely imagine the fun and discoveries people will have with the new `Play` feature, which enables you to hear functions:

`Play[Sin[30 t^2 + 2 Sin[400 t]],{t,0,2}]` `Play[Sin[Cosh[3 t]],{t,-3,7}]`



The first sounds like a squadron of B-29s massed and ready for take-off, with their engines roaring in a hypnotic low-toned, beating drone. The second spans the spectra from a fast whoop through slow wiry oscillations past a chirping to static noise, which is really just a limit of the frequency response of my stereo speakers.

by BRUCE I. BERKOFF

useful, extensions over the original version. For example, `Sign[]` can now handle complex numbers. The program includes some new functions as well, such as `NDSolve`, which can find numeric solutions to ordinary differential equations. Overall, the number of functions in Mathematica 2.0 increased from 560 to 843.

One of the most requested additions was a built-in compiler for numerical expressions, allowing vast speed increases (up to 20 times faster) for some functions. In the earlier release, users relegated the compiler to development work while they reimplemented their problems in a "real" language to get better speed.

In Mathematica version 2.0, the `Show[]` command has been extended to produce 3-D plots. (You can see the results in the sidebar "Using Mathematica.")

The new improvements to 2.0 literally go on and on: linear programming support, lexical variable scoping, symbolic execution tracing, and international character set support.

Steep curves ahead

Setting up 2.0 on the NeXT is relatively painless but with a significant quirk. After the program is installed, you must call Wolfram Research to get a Mathematica password for your computer, then install this password using Mathematica's `MathInstall` program. All Mathematica users need a password, whether the program is stored on a local hard disk or on a network, whether or not Mathematica was bundled with your system. Unfortunately, copy protection does not truly serve its purpose—to prevent piracy or tampering—but interferes with routine, responsible operation of software across complex networks. Instead of tracking the total number of licenses, an administrator is forced to track individual CPUs as

they move on and off desks. Mathematica's use of copy protection is a definite drawback.

Documentation for the program was not available in time for this review. The vast majority of Mathematica users, however, purchase the book *Mathematica* by the program's author, Stephen Wolfram (Addison Wesley, 1991), and use it as a reference guide. The book is not NeXT specific, but Mathematica works much the same on all platforms.

Learning Mathematica can be intimidating, and not just because it is a sophisticated program dealing with graduate-level technical concepts: it does not use standard mathematics syntax. Why can't it understand the already familiar notation we've all been raised on? Instead of letting the user type $2\sin(x^3-y^{1/2})e^{-2x}$, Mathematica forces the user to type $2\text{Sin}[x^3-y^{1/2}] * \text{Exp}[-2 x]$.

No one's going to use Mathematica instead of a desk calculator. Rather, it's an environment for understanding complex problems mathematically. When business users and artists see the 3-D graphs Mathematica offers as output, they'll want to get their hands on it, but they'll find that those lovely forms are attainable only by knowing secret passwords like `Plot3D[3*Sin[x*y],[x,-2,2.5],[y,-2,2], AxesLabel->{"x","y","z"}, ColorFunction-> Hue]`. Well, scientists deserve some tangible reward for their labors. ☼

BRUCE I. BERKOFF is a doctoral candidate at the University of California at Berkeley and a founding member of Berkeley Scientific Associates, a software development and consulting firm based in Berkeley, California. He can be reached at bruce@hydrogen.cchem.berkeley.edu

A Batch of Compilers

Third parties supplement NeXT's programming toolkit

by SIMSON L. GARFINKEL

Compilers are a crucial component in the chain that creates applications. Programmers write sets of instructions in special programming languages like C, BASIC, Pascal, and Lisp. Each one of these instructions, like DO or PRINT, translates into many discrete operations by the microprocessor that runs the computer. The compiler translates between the high-level programming language and the machine language that the microprocessor can understand.

In addition to doing this basic function, compiler products often include auxiliary products necessary to complete the programming task. These might include a function library or a debugger, a tool that steps through a program until it breaks, pinpointing the exact problem that needs fixing.

Programming tools

If you have the NeXTstep 2.0 Extended Edition, you've already got a powerful software development environment: the Free Software Foundation's GNU C compiler, GNU Debugger (GDB), and Emacs, a program editor. The compiler has full support for both the Objective C and C++ languages, as well as standard ANSI C. The debugger, which allows source-code-level debugging of all three languages, is one of the best on any platform; the Emacs GDB interface lets you trace program execution in one Emacs window

while following the current spot in your source code in another. What more could you want?

Plenty. If your livelihood is spent maintaining and running a 100,000-line Fortran program, the prospect of trying to rewrite it into C or C++ is simply a non-starter. What you really want to do is take that Fortran program, link it with an Objective C front end, and have it graph its results in a NeXTstep window. You can do that with Absoft Corporation's Fortran 77, reviewed below. Alternatively, you might have a Lisp expert system that you might want to have running on the NeXT, taking advantage of the NeXT's graphical interface. If so, Franz's Allegro CL is for you. Or in any case, you might just prefer using a language other than C or C++, or you might like the feel of a competing product.

Review guidelines

There are many criteria for judging the quality of a compiler. First, does it work? Does it compile properly working code into a program that can run on your platform? Also, since NeXT programs need to conform to a specific interface, we judged how well a compiler provided a connection between itself and NeXT tools like Objective C classes and Interface Builder.

Then there is the question of how well the compiler completes the task. Normally, one would look at how efficient the compiled program is compared to the

source, or original, programmer's code. There are standard benchmarks to make this determination. Unfortunately, it seems that compiler manufacturers often make sure that their products do well on these few specified tests. Therefore, our tests focused on code of our own design. Further, because of the lack of head-to-head competition between these compilers, we downplay the importance of formal benchmarks in our review. It should be noted that one vendor, Oasys, takes severe exception to our policy on this issue.

Because compilers are generally used by skilled, relatively expert users, we have given less weight to documentation and on-line help than we do with reviews of products designed for end users. Also, since most programming is done on featureless, character-based screens, we did not heavily weigh the user interface.

In this review, we've looked at a number of compilers available for the NeXT, along with the BugByte debugger. They are grouped by general utility and approaches to the compiler problem.

Compilers the NeXT way

Both Fortran 77 and Allegro CL are examples of how a compiler should be ported to the NeXT platform. Each company started with a reliable, full-function compiler, and then added support for NeXT's Objective C and Interface Builder.

The idea of using Objective C with Fortran or Lisp might seem a little odd at first. Here's how it works: From within your program, you tell the compiler which Objective C classes you want to use. Then — just as from Objective C — you send the class a message to create a new object. Once you have an object, you can send the object messages as well.

Using Interface Builder nib files is only slightly more difficult.

Basically you have to create a new Application object and send it a `loadNibSection:owner:` message. Both Absoft and Franz include numerous examples of how to interface between their languages and NeXTstep.

Of course, you'll need the keyboard to write your programs. Although you can use these compilers from Terminal's command line, you'll be happier if you run them from within Emacs. Emacs has a Fortran mode that knows all about Fortran indenting, tabbing, and continuation-line semantics. You can compile from within Emacs by using the M-X compile command. And GDB works fairly well for source-level debugging of Fortran programs. (Although GDB will not display the EXTENDED, REAL*12, and COMPLEX*24 data types, you can write your own functions to print these values and call them from GDB.)

The beauty of Lisp, of course, is that the development environment includes an integrated compiler and debugger. Franz's debugger and Lisp inspector (another programming tool) are very nice; they're built into the main command loop rather than supplied as separate systems, as is the case with other versions of Lisp. Franz has made extensions to Emacs to make the inferior Lisp mode work even better. Of course, all of this takes memory. Don't even think about running Lisp with less than 16MB of RAM; 24MB or more is a must for serious work.

Franz's Lisp was originally shipped bundled with the NeXT operating system, back when NeXT was aiming for the university marketplace. Although the compiler wasn't bundled with NeXTstep 2.0, NeXT will be providing a free upgrade for all 1.0 customers who ask for it.

We consider both of these products to be excellent. Both fit well into the NeXT environment

and do their unique jobs well. We award five cubes, our highest rating.

If you must use COBOL

If the idea of running an antique batch-oriented mainframe computer language from the 1950s on your 1990s workstation turns your stomach, we're with you; but if you must, Acucobol's COBOL compiler will let you do it.

The compiler is just the company's standard UNIX COBOL compiler, recompiled for the NeXT and shipped on a 3.5-inch floppy disk. Installation is difficult. After you get the files off the floppy disk, you must copy a special file into a system directory. (COBOL doesn't use the NeXT's standard `/etc/termcap` file). Then you have to edit this file if you want to run Acucobol's demonstration programs, since the NeXT keyboard doesn't have function keys. Finally, you have to edit your `/etc/rc.local` file and reboot your computer to start the COBOL record-locking daemon. More thought is needed here.

Beyond installation headaches, there are problems with the COBOL implementation itself. Acucobol's Acucobol-85 is a solid, reasonably fast COBOL implementation that runs on a wide variety of platforms, including PCs. But because the company is committed

to having virtually the same program run on every platform, the NeXT COBOL implementation has all of the PC's limitations: Acucobol programs can have a maximum of 1MB of code and 64KB of data. COBOL programs must be run from the Terminal; there is no support for NeXTstep or Display PostScript. And there's no provision for simultaneous access of the same database from different workstations (because Acucobol's lock daemon runs on your workstation) instead of your network server.

Acucobol is currently designing a version of its product that will run under NeXTstep, but that version isn't expected until the middle of 1992 at the earliest. If for some reason you have to run COBOL on the NeXT, you can probably do it with Acucobol. But why would you want to? We give this product two cubes.

TermiNeXT

Although not a compiler, BugByte 1.0 – a graphical front end to the GNU Debugger – is conceivably useful for anybody who develops programs on the NeXT.

BugByte has a main window that shows the source code of the module that you are currently debugging. Four buttons let you set, clear, enable, or disable break-

points; they show up as iconic stop signs in the left column of the display. A Function Inspector lists all of the source files and the functions that they contain in your program. The Frame Inspector lets you look at the stack frame.

In many ways, BugByte mirrors functionality already available on the NeXT: GNU Emacs has a `gdb` mode that provides much of the functionality of BugByte. In fact, a lot of common debugging tasks, like jumping up and down the stack frame, are faster from Emacs.

BugByte shines in the way that it makes use of the NeXT's windowed screen to show a lot of information about your program all at once. But a lot BugByte functions are more complicated than they should be. For example, to discover the contents of a variable, you click on that variable and press Return, but its value appears in another window. There isn't even any indication that the variable and its value are related.

Also, BugByte doesn't check the user's breakpoints to make sure that they're valid. You can just as easily tell the program to set breakpoints in comments as in actual code. Breakpoints in comments won't do anything, but the program will happily display them, confusing novices and expert hackers alike. Another problem with

BugByte is that it displays only one code window on your program at a time, isolating the debugging process from the code writing.

BugByte is a good idea for programmers who don't want to use Emacs, but the product needs more fine-tuning before it becomes a viable alternative to GNU Emacs. We give it three cubes.

Straight across

Oasys sells its Green Hills Compiler Family of C, C++, Pascal, and Fortran for 19 different computer/operating system combinations. Their compilers can generate code that runs on the Motorola 680x0 processors, the Intel 80386, the AMD 29000, as well as several other architectures. One of the great strengths of the company's compiler offerings is that all of the languages use the same calling conventions, so programs written in one language can call subroutines written in another.

This theme of interoperability runs through all of Oasys's compilers. These are probably the only compilers still supported by a solvent company that can generate code for computers built by Charles River Data Systems or generate in-line calls for the Sky floating-point unit.

Unfortunately, the generality is not needed on the NeXT platform.

Object-Oriented Fortran 77	◆◆◆◆◆	A complete implementation of the FORTRAN 77 Language, extended to work with NeXTstep and Objective-C. An excellent product.	\$995	Absoft Corporation, 2781 Bond Street Rochester Hills, MI 48309. 313/853-0095
Allegro CL Ver. 3.1 (Common Lisp)	◆◆◆◆◆	A comprehensive Common Lisp implementation, extended to work with NeXTstep and Objective-C. An excellent product.	\$1875 <small>50% discount for education</small>	Franz, 1995 University Avenue Berkeley, CA 94704. 415/548-3600
Acucobol-85	◆◆	A platform-independent COBOL development and run-time system. No NeXT specificity.	\$1995	Franz, 1995 University Avenue Berkeley, CA 94704. 415/548-3600
BugByte 1.0	◆◆◆	A NeXTstep front-end for the NeXT's GNU Debugger. Not a viable alternative for Emacs with GDB yet, but useful for some people.	\$295	Acucobol, 7950 Silverton Avenue #201 San Diego, CA 92126. 619/271-7097
Green Hills C Compiler	◆◆	A UNIX 680x0 native C compiler. Does not cooperate with the NeXT and in fact conflicts with it.	\$1200	ONyX Systems, 2325 Claretton Drive Arlington, TX 76018. 817/432-9107
Green Hills Pascal Compiler	◆◆◆	A UNIX 680x0 native Pascal compiler. An acceptable Pascal implementation; nothing NeXT specific.	\$1700	Oasys, 230 Second Avenue, P.O. Box 8990 Waltham, MA 02254-8900. 617/862-2002
Green Hills FORTRAN Compiler	◆◆	A UNIX 680x0 native FORTRAN compiler. No NeXT-specific features, some compiling problems.	\$1700	Oasys, 230 Second Avenue, P.O. Box 8990 Waltham, MA 02254-8900. 617/862-2002

COMING ATTRACTIONS

MicroPhone II

The first commercial communication program for the NeXT puts you on-line with a host of features

by ROBERT LAURISTON

Are you a mere mortal? Fed up with having to make do with tip to access on-line services, BBSSs, and non-UNIX mail systems? Take heart. By the time you read this, Software Ventures should be shipping MicroPhone II, a full-featured, menu-driven NeXT telecommunications program.

Judging by the early beta version I examined, MicroPhone II for the NeXT will be very similar to the current Macintosh and Windows versions of the product. That means a couple of terminal emulation options (TTY and VT102, plus variations), a choice of file transfer protocols (X-, Y-, and Zmodem – no Kermit in 1.0) and modem standards (Hayes, Telebit, V.32bis, and MNP5), and a rich, flexible scripting language.

Creating scripts to automate MicroPhone sessions can be as

easy as turning on its “watch me” mode and logging on to a service. Once you’ve recorded the script, you can assign it to a push button at the top of the MicroPhone terminal window and decorate the button with one of the icons included with the program. If you want to get fancy, you can use the program’s script editor to add logical branches, prompts, dialog boxes, and custom command buttons.

Using programmable menus and push buttons, power users can create custom MicroPhone front ends for those less technically inclined. It’s even possible to create a front end with Interface Builder and link it to a MicroPhone script. Luckily, Software Ventures plans to include canned front ends for CompuServe, Dow Jones, GENIE, the Internet, and possibly MCI Mail in the initial release, with more to follow later.

Although Oasys has been shipping its compiler offerings for the NeXT computer since 1989, the company has still not adopted its programs to the NeXT platform. Installation is complicated by the fact that Oasys doesn’t use NeXT’s installer program, nor does it provide any automatic installation system. The company doesn’t even provide NeXT-specific printed documentation.

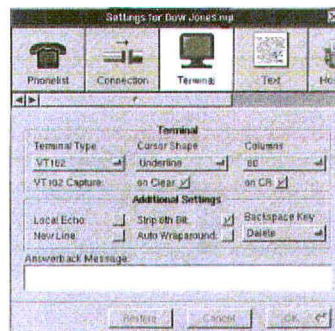
Oasys’s C compiler cannot be used with many of the NeXT-provided include files in /usr/include. (Oasys includes its own version of `stdio.h` and `stdlib.h`, which its compiler invisibly substitutes for NeXT’s when the `#include` directive is processed.) After I modified

my test programs for use with Oasys’s C, I was unable to compile the programs with NeXT’s built-in GNU C Compiler. Although the Oasys C compiler produced code that was more compact than the GNU C Compiler, it required significantly more space for constants in the `__DATA` segment. When the amount of code in `__TEXT` and `__DATA` were added together, GNU C actually used less space.

Oasys’s Fortran compiler is a full-featured Fortran that supports VMS, Fortran 77, and Military Fortran. This would probably help somebody trying to port a large program written in VMS Fortran

There are a few MicroPhone goodies unique to the NeXT version. You can use NeXTstep’s built-in Spelling utility to check your on-the-fly typing before you post it for the world to see. NeXT users not attached to a network will be able to use MicroPhone to receive NeXTmail messages, though graphics and Lip Service sound will be stripped out of the main message and attached as separate files. You can set up MicroPhone to track Usenet news groups (like `comp.sys.next`) for you. Your network guru can even create special connection scripts that let you dial out using a modem attached to a network server or another workstation.

One MicroPhone idiosyncrasy



MicroPhone II's Settings panel simplifies complex telecommunications commands with a NeXT-like graphic interface.

I found hard to get used to is that serial port settings (like 1200-N-8-1) apply to all the services in a dialing directory. You can get around this by using a separate session file for each service you call or by including port-setting commands in each script. On the other hand, I really like the way the open-ended screen buffer works. When downloading a long passage of on-line text, you can start reading the beginning while MicroPhone keeps downloading the rest.

MicroPhone II for the NeXT looks like it will prove a powerful telecom tool. With a little assistance from a local NeXT expert or Software Ventures’ phone support, even the most naive NeXT user should be able to get on line. 🐥

“Coming Attractions” are first impressions of important unreleased software packages. *NeXT-WORLD* will publish a full review with cube ratings in a later issue.

ROBERT LAURISTON is a contributing editor for *NeXT-WORLD*, *PC World*, and *Nikkei PC*. He can be reached by e-mail at duck@well.sf.ca.us.

or Military Fortran to the NeXT. The Fortran defaults to VMS Fortran; the `-novms` flag must be specified for Fortran 77 compatibility. Even with this flag, the compiler could not handle the `REAL*12` data type.

The Pascal compiler is a good one, though Pascal is little used these days as a professional tool. Some high schools are still using the language, but not many are going to cough up the \$1700 that Oasys’s Pascal costs – especially when Turbo Pascal for the PC costs \$149.95.

Although none of these compilers have been modified to work with Objective C, they will all gen-

erate code you can burn into ROM. Moreover, Oasys documents which operating system calls (like `open(2)` and `read(2)`) need to be supported to make the code they produce run on another platform. That’s great if you’re writing programs for an embedded computer that runs without operating systems. If your writing programs on a NeXT, however, you’ll probably want to use something else. We give the C and Fortran compilers two cubes and the Pascal compilers three cubes. 🐥

SIMSON L. GARFINKEL is a senior editor at *NeXTWORLD*.

ADOBE ILLUSTRATOR 3.0



Illustrator is like a really good racing bicycle. You know that only skilled folks can get the full value from it, but after Greg LeMond hops off, you try a spin just to enjoy traveling at warp speed. Of course, what happens is that your butt hurts.

Don't get me wrong. I love Illustrator – not necessarily using it, but watching other people use it. This is not meant to be sarcastic. It needs all that functionality for professional illustrators; I'm just not that type. And as stupid as it sounds, I've never been as successful using a drawing/painting program as I was with the original MacPaint.

The fact is that only so many of us actually illustrate. For those who do, Illustrator is fabulous, perfect, a thing of beauty. The thing I especially like is the Auto Trace tool. Take an image, start tracing, and soon the image is reduced to a huge number of little dots that are easily manipulated. I also like the wide variety of brushes and blending tools. It feels like one of those stand-up Snap-On Tool chests down at the garage.

The other great thing is the documentation. These docs are huge, complete, and well indexed.

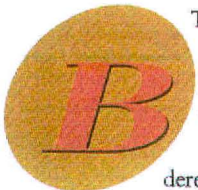
All of the goodies round out the mix. Modifying the structure of Type 1 fonts on the fly is fun. Producing graphs with pictures of objects instead of boring lines makes everyone a little *USA Today*, even if the potential for abuse of this feature is high. My only wish is a special switch to turn this into a mere mortal Illustrator. They could label it Stupid mode. I won't mind. **Big thumbs up.**



The same folks who bought Macs so they could use Illustrator should now seriously consider switching to the NeXT for the same reason. The most important reason is speed. Redrawing a complex illustration on even the fastest Macs is like watching paint dry. It gets much worse when color is involved. Add to this the fact that you have to wait for that glacial redraw every time you switch between artwork and preview modes (which you must do often) and it can become a real character builder. With Illustrator for the NeXT, you can stay in preview mode. What you draw is what you see.

Printing is also much faster. One drawing that took my Mac and NTX LaserWriter 16 minutes to print came ripping out of my NeXT printer (in higher resolution) in 27 seconds. My thumb is up and it's even bigger than yours.

SOFT PC 2.0



The sight of the dreary DOS prompt on a graphical screen has always seemed a little perverse. Nevertheless, DOS is what drives most of the PCs in this harsh world. It's a terrible thing, but there it is.

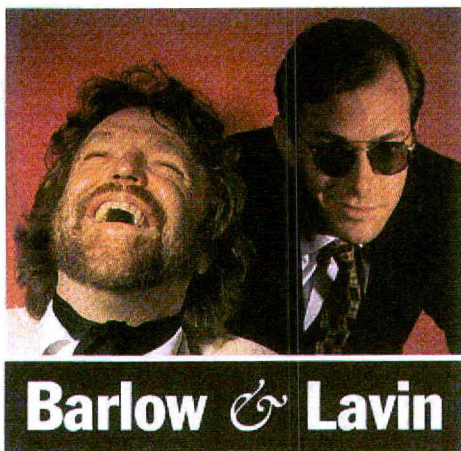
For that reason, a "non-standard" machine is rendered far more practical by the presence of SoftPC. It enables the enlightened Mac or NeXT user to examine the data generated

by his primitive colleagues in their native habitats. Furthermore, there remain a lot of MIS tyrants in the corporate environment who will not let you put a non-DOS machine on your desk. Thus, SoftPC allows one to be cool and employed at the same time. Not a bad deal.

Unfortunately, the Mac is just too slow to run SoftPC for anything but occasional purposes. It creates a virtual PC in my SE/30 that operates at about half the speed of an AT-class clone. And that's too slow.

SoftPC for the NeXT is another matter. Juiced up by the 68040, it's able to create something equivalent to what you'd pay \$1500 for at Fry's – a real 12MHz 286 with an EGA monitor and a very large hard disk. And it runs every piece of DOS software I've thrown at it.

Furthermore, it does something clones can't do: genuine DOS multitasking. By running several copies of SoftPC concurrently, one can copy and paste between, say, a Lotus spreadsheet and a WordPerfect memo. Or recalc the spreadsheet while writing the memo.



The only thing it can't do as well as any other clone is run Windows. (Actually, it can, but during the time it takes to translate Windows graphics calls, one could easily lose interest in the outcome.) I'm not sure this is a problem, though. Unlike most software, of which more copies are in use than have been bought, Windows, as Esther Dyson pointed out, is bought more often than it's actually used.

I loathe DOS. But its evil is loose in the Real World and one must live with it. SoftPC on the NeXT is the best way I know to do that. Tell your boss it's just a black clone with an attitude. He'll never know the difference. **Thumbs up.**



John, I agree that SoftPC is extremely well done. But you are dead wrong on the importance of graphical programs like Windows on the PC. People who think a million copies of Windows are being sold and not used are deluded. They're like the car makers who thought millions of people bought Japanese cars because they were cheap but didn't really like them.

SoftPC must get its act together on graphics speed and be less confusing on its interface with external hard drives and the like. Still, it's a cool product. I think Insignia should gamble that Apple laid off its lawyers in the most recent reorg and produce a SoftMac/NeXT. Now we'd be talking seriously cool. **Thumbs up.**

FLOPPYWORKS 2.2



We can all be pleased that DIT took the bull by the horns and produced this product. FloppyWorks does several things, but all that anyone really cares about is that it allows you to read Mac files. Actually, that's something NeXT should have done itself in System 2.0, but that's not DIT's problem.

There are, however, some shortcomings with the product. First, it is a stand-alone application. The relatively clumsy interface gets in the way of simple operations. The Browser-like system for manipulating files is different enough from the NeXT standard to cause fits. Installation is no fun

and not at all network-friendly. All these things are DIT's fault. Also annoying, though not DIT's fault, is that you can use only Macintosh SuperDrive (1.4MB) floppies. Earlier 400K and 800K disks are not readable by the Sony drive in the NeXT.

Despite all this, DIT has done a real service with a solid product. It works much better for simple file transfer than does the several-thousand-dollar GatorBox. And the price is right at \$250. **Thumbs up.**

B As you say, you can't take DIT to task for FloppyWorks's inability to read smaller Mac disks. It's a NeXT hardware problem that DIT has taken the trouble to address the only way it could: It built its own external floppy drive, the CubeFloppy, which reads 800K disks well. Furthermore, DIT went to the trouble to make its software recognize and read several different Mac formats of Quest disks.

Finally, I'm not sure what about their exceptionally smooth interface could cause you such fits. While it would be nice to see those Mac disks pop up in the Workspace, you'd be missing the ability to use FloppyWorks's important translation filters when copying files, if you implemented it that way.

You're wedged, pal. But FloppyWorks isn't. I probably use it ten times a day, and I'm very grateful for it. **Thumbs up.**

DIGITAL LIBRARIAN 2.0

B Librarian is almost a really wonderful thing. It's especially useful for a disorganized writer like me, since I can never seem to remember where I stash information. It would be nice if the NeXT also offered an effective way to find files which might have been buried in the data brambles of a 660MB hard disk. The so-called "finder" is erratic and slow. But if the finder makes it hard to search for files by name, with Librarian you can index all your data directories and search by content.

It's also excellent for its most common purpose, which is searching on-line documentation. You can also use it to search the works of Shakespeare, or anything else you might drag into its target window, such as, in my case, the King James Bible.

Unfortunately, Librarian also has some problems. First, it's fairly useless with large files. If the files aren't broken up into small pieces, it isn't going to get you very far. Second, it lacks the ability to search for strings. It just looks for the words themselves. So if you're looking for, say, "quick and the fox," it's as likely to give you "the quick and the dead" as its first hit. It also can't do multiple word searches.

Third, it doesn't really search the target files but rather an index of all the words in them. That would be all right, but it doesn't update these indexes as changes are made (unlike a similar Mac product, OnLocation). If you're searching an active data folder, you have to periodically create a new index from scratch, a time-consuming process. Worse, it has a button, "Update Index," that doesn't update the index. The only way to do that is to eliminate the old index and create a new one.

Librarian is like a lot of things on the NeXT. Incredibly cool in concept but still a little short on delivery. I guess I'm thumbs up, but I want it to become the valuable writer's tool it promises. **Thumbs up.**



Librarian is truly dangerous in the right hands, but those hands don't seem to be mine. It sat there looking forlornly at me from the dock for about a year, then got displaced for a permanent TextArt slot. This is one of those tools I thought I'd use all the time, and it's even more frustrating that other people I know seem to be using Librarian all the time.

Basically, the incredibly simple interface on the Librarian just does not lend itself to the everyday work for which it would be truly useful. Maybe it needs to be more complex. Maybe the Librarian could be more than a service. It could be a panel shared by all applications, like the Font panel. My system-level friends will be all over me for that one, but it would let me open it more than once a year. Because I don't find it useful, I'll put my thumb sideways on this one.

NEXT KEYBOARDS



NeXT began with the old keyboard – a pretty mediocre product compared to similar offerings from other manufacturers – then made it worse. The old keyboard suffered from being too flat, unorthodox in its handling of special keys like Alternate and Control, and lacking function keys. Of course, the keyboard was not the worst part of the original system. That distinction belonged to the mouse.

When the new systems came out, someone noticed that the original keyboard was not nearly as atrocious as the mouse. They fixed that problem. The new keyboard is so bad that the keys are even arranged wrong. It's useless for UNIX. Several keys were moved out of easy typing range. Programming is much harder on the new board. A few key combinations are not even possible on the new board.

All the really cool people have a new '040 machine or upgrade and an old keyboard. **Old keyboard: Thumb down. New keyboard: Thumb even more down.**



I must be one of those really cool people. I have an old keyboard and an '040 machine. And I'm grateful for that. While I'm far from being the UNIX weenie I aspire to becoming, I use the Terminal enough that I'm glad the common UNIX keys on my keyboard are put where I can get to them.

Actually, my keyboard complaint has to do with a larger issue: mouse religion. It is apparent from the relative lack of command-key combinations in NeXT's bundled programs that they believe you should reach for the mouse a lot. (Maybe it's like a Tibetan prayer wheel. Every time you use the mouse, it's an act of homage to Steve.) What I really want from NeXT is an extended keyboard and a macro program.

Old keyboard: Thumbs up. New keyboard: All thumbs.

Is it a coincidence that JOHN PERRY BARLOW keeps saying he is grateful? As for DAN LAVIN, if he were any cooler he'd be dead. Send e-mail while you still can: jbarlow@nextworld.com and dlavin@nextworld.com.

NeXT Best Thing to Being There

As a telecommuter, you should be able to perform your essential job functions from home or other remote locations, but you hit stumbling blocks. How do you get to a file or printer at the main office's LAN, or run that one specialty application that you don't have on your home machine? Or if you run a small business with remote sites, how can you bridge the local networks in order to more efficiently share resources? Your colleagues in the universities have access to the massive resources of the Internet. How can you get on the Internet if you're a home NeXT user?

Teleconnect from Marble Associates offers an integrated solution. This suite of software applications enables a NeXT computer to

run the Internet protocol and all software packages that depend on it via modems and plain old telephone lines. It includes a commercial implementation of the UNIX SLIP (Serial Line Internet Protocol) program and associated utilities. Once Teleconnect is set up on your computer and the remote LAN, connectivity is seamless and transparent. Whenever you attempt to access the remote network, Teleconnect will use the modem to call the server and establish a teleconnection. At that point, you may send mail to users on the LAN, transfer files via the `ftp` and `rcp` utilities included with NeXT computers, or access remote file systems that are mounted via NFS. Once you're finished, Teleconnect will save phone charges by automatically hanging up the telephone.

Teleconnect differs from conventional PC communications products in two ways. It connects a remote user to a network and all shared network resources, rather than to a single computer. Teleconnect does not restrict the user to a single terminal window or application: It exploits the multitasking abilities of UNIX and the NeXT-step environment to enable the user to run many applications concurrently over a single teleconnection. Teleconnect also differs from other implementations of SLIP by con-

forming to the graphic and iconic conventions of NeXTstep.

Teleconnect itself is easy to install and configure. The Teleconnect figure application may be set to connect to a maximum of 16 remote computers. The main teleconfiguration panel contains fields for the IP addresses and hostnames of both the localhost and the remotehost. You specify how to connect to the remotehost in a third field by entering the phone number of the remotehost, the modem script to be used, and the port your modem is on.

The main hitch in setting up teleconnections is properly configuring the modems on either end. Teleconnect comes packaged with scripts for popular modems from Telebit, Intel, Hayes, Digicom, and Neuron. But despite Marble's best efforts, the number of modem brands and possible configuration settings complicates the process of initiating a teleconnection.

Depending on how well you →

Marble Teleconnect



Teleconnect is a commercial implementation of SLIP, a UNIX program for running a session on a remote computer over a serial line. The beta version reviewed was solid, well-designed, and functioned flawlessly. Marble could provide more automatic tools for configuring modem settings.

\$249

Marble Associates, 38 Edge Hill Rd., Waltham, MA 02154. 617/891-5555

Fast Backup

If you need to back up a lot of data in a hurry, Maynard Electronics' digital audio tape (DAT) drive might be for you. This little box can dump as much as 11MB a minute onto a 4mm DAT. A 60-meter tape that you can buy at most electronics stores costs as little as \$11, making the cost-per-megabyte about 0.8 cents, or 55 times less than the NeXT optical disc. By archiving unneeded items from your hard disk, you can save hard disk space that costs about \$2.50 a megabyte.

Installation is a snap. Simply set the DAT drive to an unused SCSI address, connect it to your NeXT, and turn on the power. When the NeXT boots, it automatically scans the entire SCSI bus and assigns the tape drive to the UNIX

device `/dev/rst0`.

This exact address is important, because Maynard ships the product without software, so you must use the UNIX `tar` and `dump` utilities to manage backups.

The drive is fast and it works well. Using `tar`, I was able to back up my 51MB home directory in 8 minutes, 42 seconds (10.5 seconds per megabyte). With `dump`, I archived 142MB of files in 12 minutes, 39 seconds (5.3 seconds per megabyte). Those times are based on archiving from the NeXTstation's internal 105MB drive; performance will be substantially degraded if you archive from a network-mounted disk. While these times are fast, keep in mind that tape is not random access, and it



must wind to find specific files for retrieval. This process, while fast for a tape drive, is very slow compared to optical or hard drives.

The ArchiveST2000e compares favorably with the Exabyte 8mm digital videotape backup unit sold by Sun Microsystems for use with their workstations. Sun's tape drive costs \$4000; a box of ten 2.3GB tapes costs \$300. Sun quotes a transfer rate of 14MB per minute, but the time to back up a file system would be roughly the same with either of these machines, since the speed is limited by SCSI bus transfer rates.

A green light on the drive's front panel indicates that a DAT tape is loaded and ready to go; a red light indicates that the unit is busy. Notably missing is a light to indicate if the power is turned on. A small push button makes the tape eject. Maynard currently ships

the drive in a platinum-white box, but the company says it might start selling the drive in a black box if there is sufficient demand.

Overall, the drive is an excellent, if pricey, solution to the backup problem. It needs NeXT-specific software and a lower price to make it a must-have product. ♦

by SIMSON L. GARTINKEL

ArchiveST2000e DAT tape drive



An external DAT drive for any NeXT, this device provides high-speed, high-density backup onto a low-cost digital audio tape, but lacks NeXT-specific software.

Drive: \$4475

90-meter (2.1GB) DAT tape: \$60
(direct from Maynard)

60-meter (1.3GB) DAT tape: \$11
(local electronics store)

Maynard Electronics, 36 Skyline Dr., Lake Mary, FL 32746. 407/263-3500

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- ☐ 11) Macintosh
- ☐ 12) NeXT
- ☐ 13) Unix workstation

C. Publication you read regular (please check all that apply):

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- ☐ 15) Byte
- ☐ 16) Communications Week
- ☐ 17) Computer Reseller News
- ☐ 18) Computerworld
- ☐ 19) Forbes
- ☐ 20) Fortune
- ☐ 21) Infoworld
- ☐ 22) LAN Times
- ☐ 23) MacUser
- ☐ 24) Macweek
- ☐ 25) Macworld
- ☐ 26) PC Magazine
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- ☐ 28) Personal Workstation
- ☐ 29) Publish
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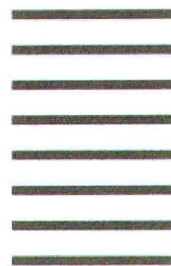
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Teleconnect

Now your modem, establishing connectivity between two sites ranges from reasonably easy to downright hard. NeXTWORLD had to experiment with multiple modem settings on its Telebit modems before it could successfully run a Teleconnect session. One of the only drawbacks to this excellent product is that Marble hasn't provided more support for modem settings. Fortunately, Marble offers first-class technical support.

Teleconnect is an essential tool for any NeXT site that supports remote users on a regular basis, and for businesses that need to implement basic wide area networking. It points to the day when transparent wide-area connectivity will be as commonplace as today's isolated personal computers. ♦

by SETH T. ROSS AND
DANIEL MILES KEHOE

A Class by Itself

Ever since Steve Jobs demonstrated faxing directly from the NeXT a year ago, there has been high user interest in the fax modems that make this a reality. Several products have appeared in the market, but the Neuron FAX96+ has generated an inordinate amount of curiosity and interest because it claims to offer both 9600-baud fax and 9600-baud modem capability. Because faxing is fundamentally different than modeming, 9600 speeds in faxes are standard, while 2400 is a more typical modem speed for this type of product.

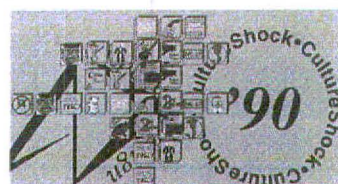
Neuron has announced that it intends to ship a telecomm program, Synapse, and Marble Teleconnect (see the Teleconnect review on the previous page) along

Goof-off Time

Since the only machine on my desk is now a NeXT, I'm faced with a dilemma—I've got to leave my desk to goof off. There are simply very few games for the NeXT. So you can imagine my excitement when I received Culture Shock, the first commercial game for the platform.

Unfortunately, Culture Shock is really a shareware-quality program that you buy like commercial software. Based on a traditional game played with tiles, it is similar to two Macintosh programs, Gun Shy and Shanghai. The object of the game is simple: clear the board by matching tiles according to specific rules. There is no documentation, but the on-line help covers all the basics.

Athena Design has added a twist by basing the game on pop culture in 1990. In most cases, a



On the way to a loss, a typical end-game. Match the two worlds, for example, and they disappear from the screen.

short sound clip plays when tiles are matched and removed: Madonna songs, President Bush saying "Saddam Hussein," or a snippet of Stevie Ray Vaughn. The sounds were very popular around the office, especially about the 10,000th time Madonna justified her love. The sound quality suffers due to the size constraints of a floppy.

The images are somewhat confusing, blending into the background. They become tiresome over time, as do the accompanying sounds. The game also relies too heavily on the entertainment industry for events of 1990. Another problem is that as in other types of solitaire games, not every starting position is solvable.

thing is nicely packaged with documentation on the modem itself, configuring the fax modem, and using the data modem with the future bundled software.

Configuration of the fax capability is straightforward. Neuron provides an installer and a clear manual that walks you through the procedure. Accessibility to the modem can be controlled so that other machines on the network cannot use it. One oversight is that there is no option to turn the modem's speaker off. Also, a visual

Neuron FAX96+ package

A fax/modem combination that transmits at 9600 bps in either mode. Its features and bundled software make it an excellent value, and its bundled software, once released, should sweeten the package.

\$1095

Neuron, 116-200 Village Blvd., Princeton, NJ 08540, 609/243-7538

Balancing the game's weaknesses is its price—\$24.95, a reasonable price for a basic game with some continuing interest—the game requires multiple plays for the user to acquire skill. Athena Design is to be congratulated for a good first effort and encouraged to create more games for the NeXT. Of course, after several dozen plays, I'm back at square one: Until there is more entertainment software for the NeXT, I'll have to goof off on my own time. ♦

by DAN LAVIN

Culture Shock

The only commercially available game for the NeXT. Culture Shock is shareware quality but priced accordingly. It is a twist on an old tile-matching game using 1990 current events.

\$24.95

Athena Design, 306 Thayer St., #89, Providence, RI 02906, 401/353-8509

indicator on the MegaPixel display that the modem is in use would be helpful.

Most fax modems have the annoying shortcoming of requiring the user to reset it whenever switching from fax to data and vice-versa. Neuron provides its own fax/data driver that can automatically switch modes so that a remote machine and modem can call your FAX96+ and log in to your NeXT. The modem is always in data mode except when actually faxing. The quality of the faxes sent was high and the modem connection seemed to work reliably.

We recommend the Neuron FAX96+, pending the release of its software, for anyone willing to spend the extra money for a fast data and fax modem. ♦

by SHMUEL BROWNS

NeXTConnection



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DOES THIS PICTURE LOOK FAMILIAR?

(WE'VE BEEN DOWN THIS ROAD BEFORE.)

We've got Connections.

Imagine this: in a small New Hampshire town, a few people get together and create an entire mail order company devoted exclusively to a revolutionary personal computer, even though many industry "experts" say it will never take off. We're talking about: ☐ PC Connection ☐ MacConnection ☐ NeXTConnection ☐ All of the above.

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Why we like NeXT: the system.

The base-level NeXTstation™—040 processor, 8 Meg RAM, 105 Meg hard drive, etc.—is more powerful than most micros will ever be. Huge applications, complex graphics, multitasking, networking—that's what NeXT™ computers were made for. And they deliver faster and for less money—than a PC or Mac souped up with all the extra memory and accelerator cards they can handle.

Why we like NeXT: the software.

Suddenly developers are able to create applications that do it all. That do exactly what you always wanted to be able to do on

Chuck Milliken, Jerry Evans, and April McGuire are just a few of the people up here who will gladly talk to anyone anytime about why they think NeXT is the greatest technological innovation since the inclined plane.

a computer as fast as you hoped you could do it. Like *Lotus Improv* with its multi-dimensional spreadsheet views and *Adobe Illustrator* with its true Display PostScript screens and WYSIWYG output. Plus installing software is really easy. Multitasking is really straightforward. And networking? We had our first network of four NeXTs operational in under two hours.

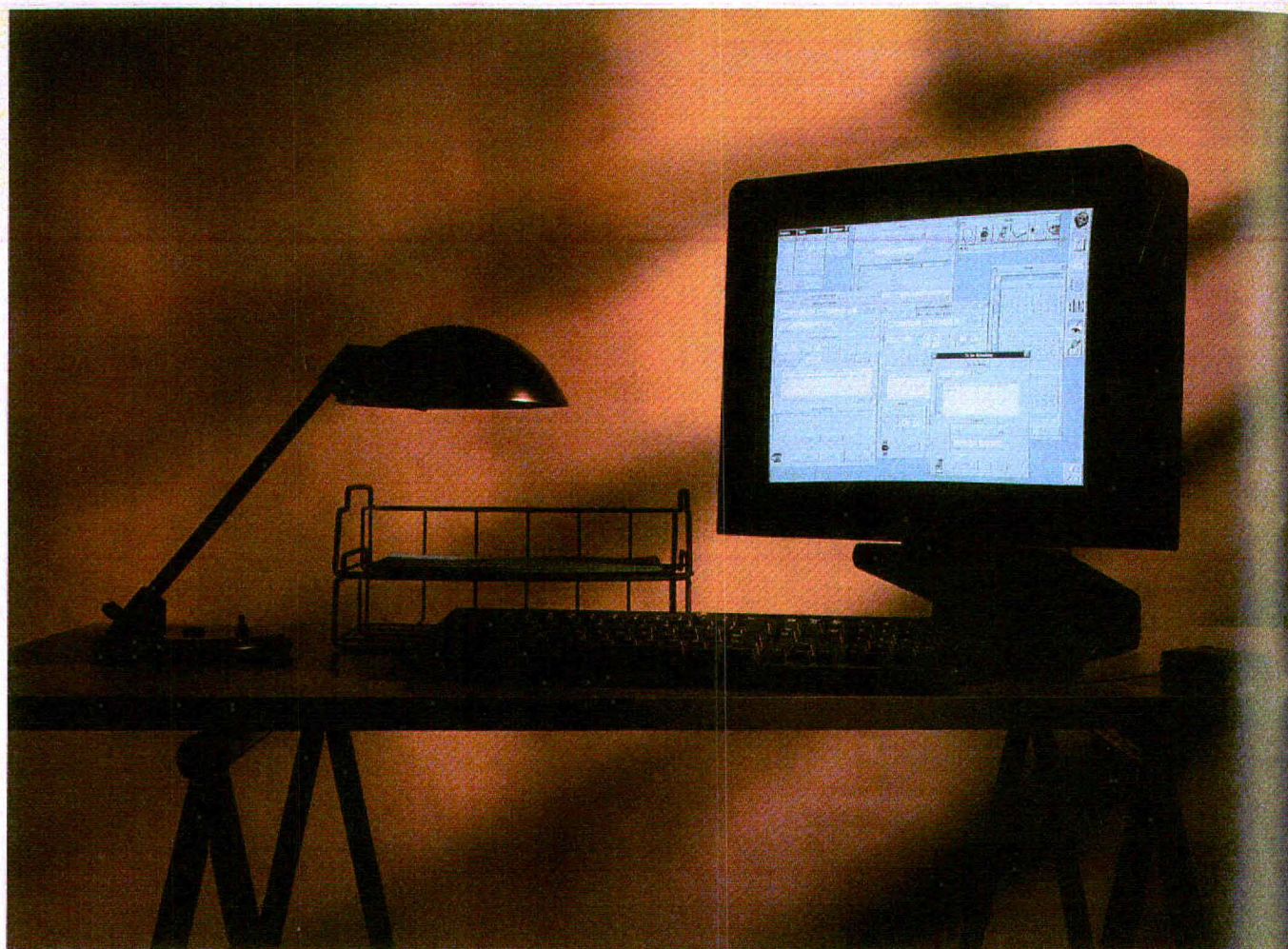
Why we like NeXT: the support.

The people at NeXT listen. And respond. In September, 1990, they reacted to criticism of the original cube by announcing a new line of machines with 040 processors, internal 2.88 MB floppy disk drives, and 2 excellent color options. All of these systems shipped within 7 months. In fact NeXT is now shipping the machine that the PC (with Windows) and the Mac (with System 7) are trying to be. And Mac and PC users are starting to make the switch.

So where do we go from here?

At NeXTConnection we offer a combination of low prices, super-fast shipping (in stock orders phoned in by 3:15 a.m. go out that same night for next day delivery—just \$3) and a toll-free number for orders and technical support.

Like you, we're also excited about all the great new programs that are on the way, and as soon as they're ready, we'll have them for you. Just like we did for the PC and the Mac. Which is why if you own a NeXT, we'd like to be your Connection. Now. And for years to come.



DIT DOES WONDERS WITH DATA.

ONDUTY

The personal information manager for NeXT users. OnDuty incorporates all aspects of a personal information manager into one powerful, easy-to-use program. OnDuty gives you unprecedented flexibility in linking important names, telephone numbers, addresses, contact information, appointments, to-do items, and notes. A powerful lookup facility puts all your data at your fingertips, and its server-client database allows multiple users.

OnDuty has all the features you need to get your business day under control: a sophisticated and integrated calendar, a To-Do Manager, a Contact Manager, an Appointment Manager, a Calculator, and a Notepad. And when it's time for an accounting, OnDuty is there with a full range of ready-made reports. A data import and export facility is included.

Digital Instrumentation Technology

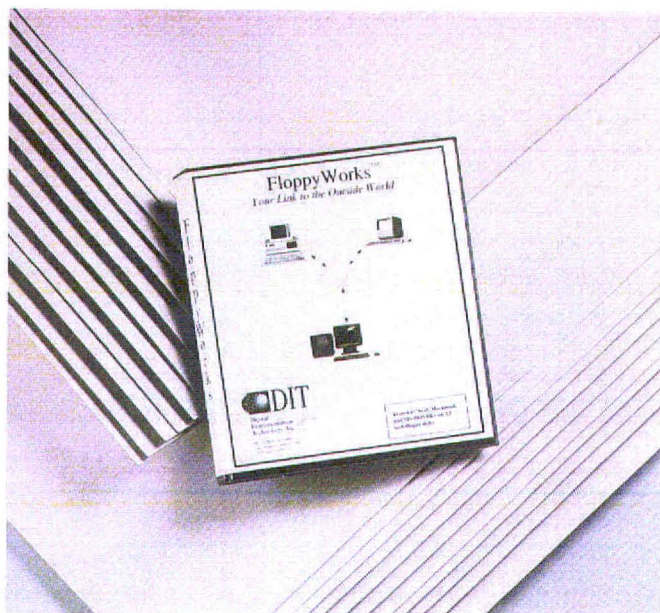
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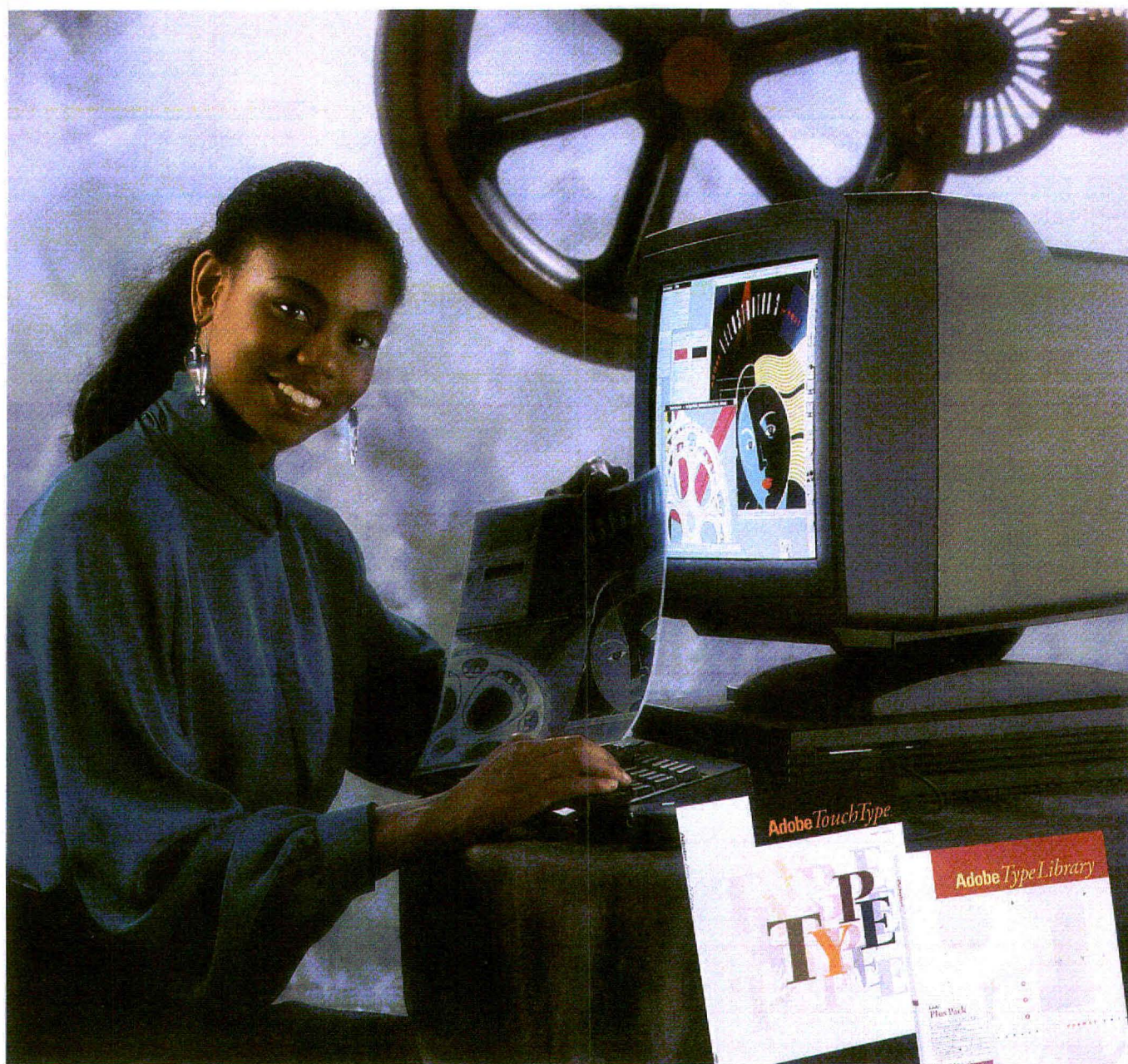
FLOPPYWORKS

Read, write, and format Mac diskettes? Not only can you do that, but FloppyWorks also lets you transfer files easily between Mac, MS-DOS, NeXT, and OS/2 diskettes—720K, 1.44 MB, and 2.88 MB—making it an essential utility for NeXT users who need access to PCs and Macs. File transfers are a breeze—just point and click between two browsers showing files on the hard and floppy disk. And file transfer filters provide a simple means of adjusting data files for different word processing, spreadsheet, database, and graphic formats. Buy FloppyWorks alone or bundled with CubeFloppy 2.9, DIT's external floppy drive.

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8656 FloppyWorks \$185.
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GET MORE GRAPHIC THAN EVER BEFORE.

ADOBE ILLUSTRATOR

A must for anyone designing a page on a NeXT. With **Adobe Illustrator**, you can start from scratch, create grids for precision drawing, "Auto Trace" existing artwork (including color shades and hues), and/or import EPS and TIFF images. Enhance your visuals with airbrush, contour, highlight, and fill effects using as many colors as you like.

Enter and edit text directly, incorporating various typographic sizes, styles, and colors; and take advantage of sophisticated editing features like text wrap, kerning, vertical shifting, and custom letterforms. Illustrator uses NeXT fonts and color panels, so specifying type and color is easy

(PANTONE support, too!). You can edit pages in "preview" or "preview selection" mode—you'll see changes instantly. And NeXT services like Mail or Librarian simplify file transfers and text searches. Overall, it's the ideal tool for business graphics, knock-out ads or flyers, and/or complex technical illustrations.

Also from Adobe, the new **Adobe TouchType** gives you expert typography in an easy-to-use interface. It's the perfect complement to Adobe Illustrator and all other applications that use or need type. Features include powerful kerning, a font selector that allows you to choose a typeface by viewing its design (rather than a list of names), and the

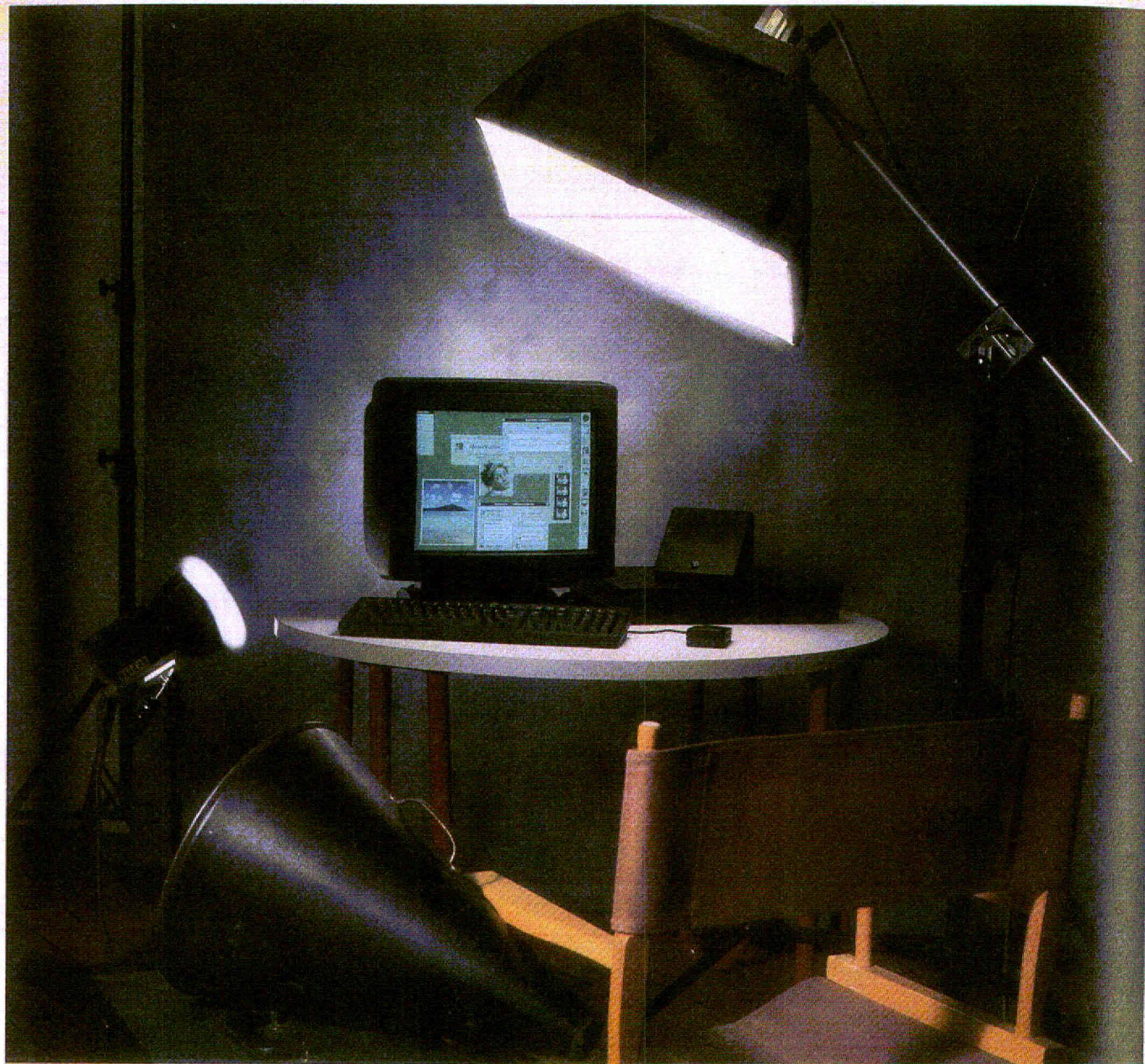
ability to position letters anywhere on the page. And to spruce up your type collection, try the **Adobe Plus Pak** (22 popular Type 1 PostScript Fonts) and/or **Adobe Type Set Packages** (#1 and #2 are display; #3 for text faces) for big savings over buying individual fonts.

Adobe

1827 Adobe Illustrator 3.0	\$459.
9741 Adobe TouchType 1.0	175.
9765 Adobe Plus Pak 1.0	129.
1832 Adobe TypeSet 1	65.
1832 Adobe TypeSet 2	65.
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NeXTConnection



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MEDIASTATION 1.53

Lights, camera, action, sound, and more. Welcome to the wonderful world of **MediaStation**—the integrated multimedia database and authoring system. This multitasking, multiuser application package lets you capture, process, organize, store, and present high-resolution graphics, CD-quality sound, animation, video, and text. MediaStation was developed for folks who archive and retrieve media and who create computer-based training, interactive presentations, electronic storyboards, and dynamic multimedia libraries. Additional uses are possible in medical imaging, facilities management, human resources, and other fields.

In MediaStation's *Format Mode*, you design the look of your graphic interface and multimedia applications. In *Enter Mode* MediaStation accepts scanned images (and TIFF and EPS files), digitized video and stereo sound, and text files. Powerful authoring tools let you edit and annotate images, sound, and text and create cell-by-cell animation. Completed entries are equivalent to database records and can be indexed, searched, and sampled in *Browse Mode*. The *Presentation Mode* with its Script Maker feature allows you to create and play back a desktop presentation, and *Forms Mode* helps you create and save forms used to print reports with images and text.

MediaStation is fully networked. Recommended storage devices include read/write optical disks, CD-ROM, and network file servers. It also supports high-resolution scanners, DSP audio devices, video recorded with *DigitalEye*, and export of multimedia to other applications. It's showtime on the NeXT.

Imagine, Inc.

1396 MediaStation 1.53	\$799.
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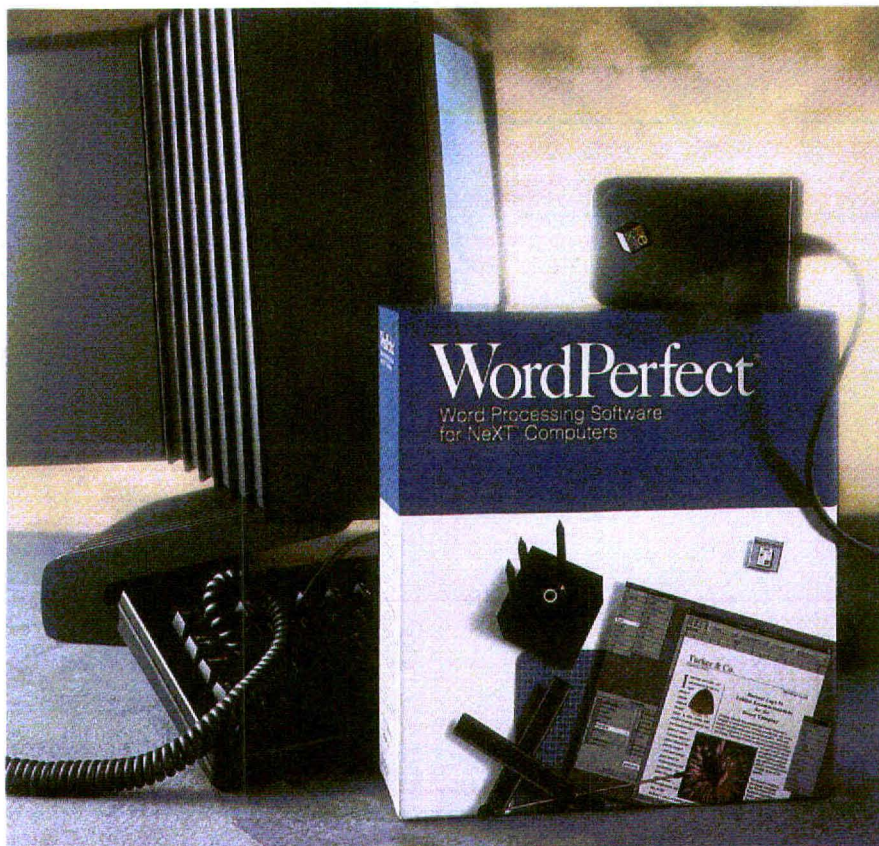
WORDPERFECT

The NeXT step in word perfection. If you want to concentrate on your writing and not your software, **WordPerfect** is just the ticket. Whatever form your writing takes: professional newsletters, brochures, correspondence, reports, or anything you care to create, WordPerfect has the features and ease of use that help keep your thoughts flowing. This full-featured word processor offers: columns (newspaper and parallel), powerful macros, merge (making mass mailings simple), table of contents, indexing, footnotes/endnotes, and much more. Questions? Ask the Digital Librarian or consult the on-line reference manual. When it's all said and done, check your work with the 115,000-word spell checker, or explore better wording with the comprehensive thesaurus.

WordPerfect easily integrates text and graphics, so you can turn newsletters or direct mailings into head-turners (and page-turners). You can place graphic images complete with captions or borders anywhere on a page (inserted in a line of text, tied to a paragraph, or placed in a header or footer) and scale, move, and rotate them in myriad ways. And to protect your work, the automatic timed backup will save your work at regular intervals. This is full-featured word processing for the NeXT.

WordPerfect

8818 WordPerfect 1.0.1	\$329.
8859 WordPerfect (5 pack)	1249.
8928 WordPerfect (20 pack)	3699.

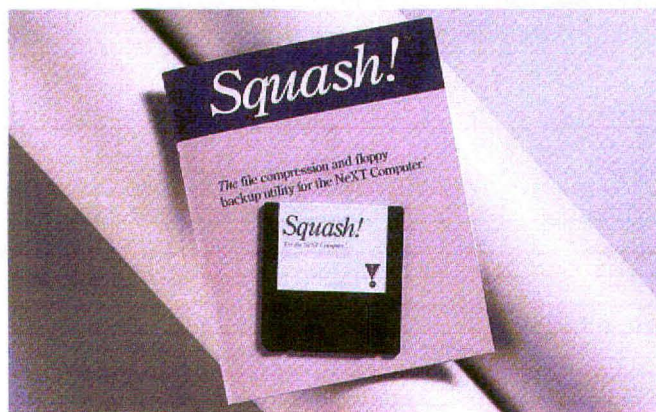


SQUASH!

The smaller the better. With **Squash!**, you can compress folders and files to a fraction of their original size. Copies of folders can be compressed onto multiple floppies, making quick backups of large folders a snap. Files can be compressed in Workspace by pressing a single command key and decompressed and opened with just a double-click. You can even have it find and squash old files at night so you wake up with more disk space in the morning! It's an inexpensive way to increase your available disk storage and backup your important data to floppies.

Agog, Inc.

1476 Squash! 1.0	\$79.
1478 Squash! 1.0 (10 pack)	699.
1479 Squash! Educational 1.0	49.
1481 Squash! Educational 1.0 (10 pack)	429.



MARBLE TELECONNECT

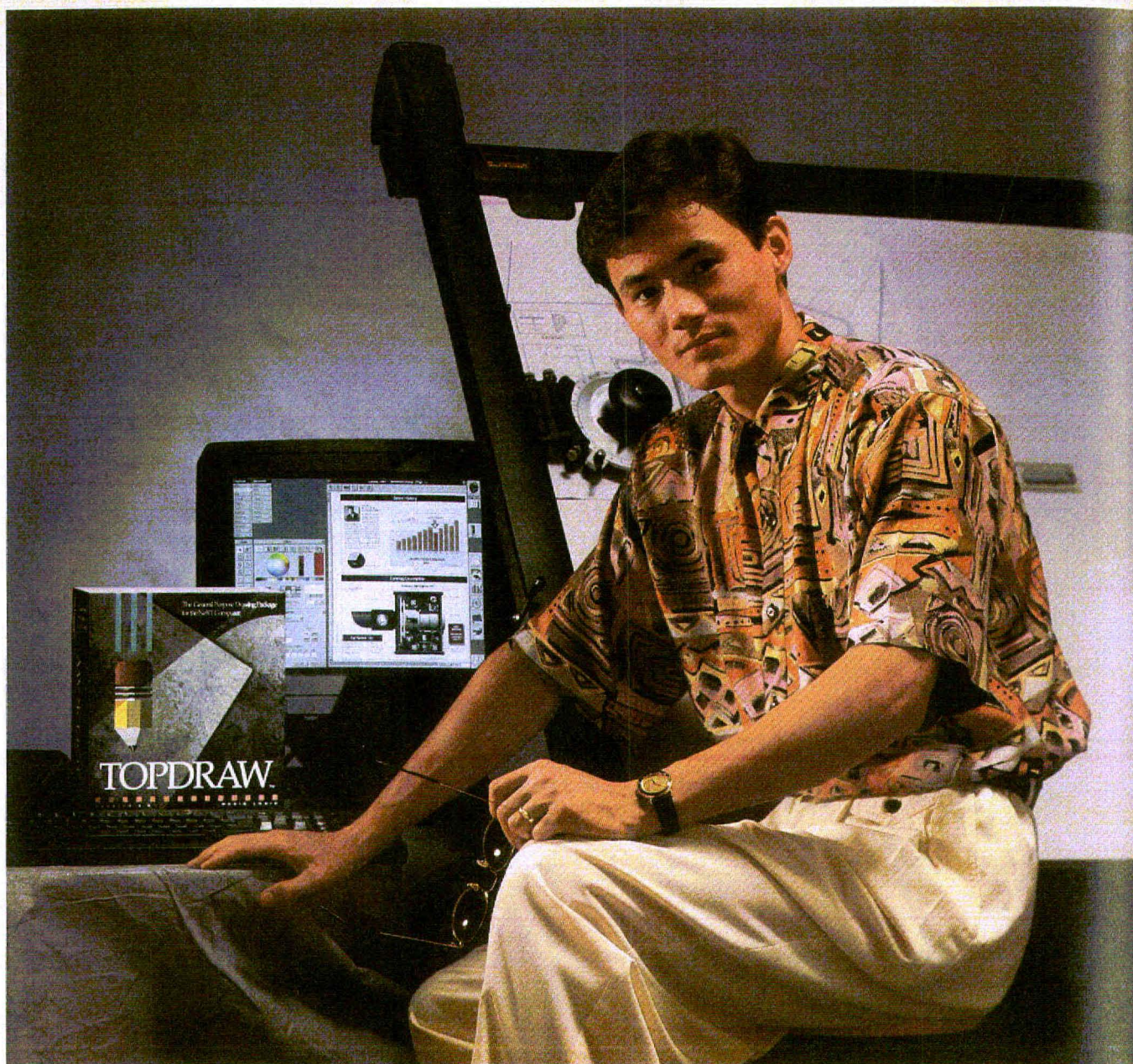
Dial in to your network. With **Marble Teleconnect**, all the resources of a remote network (such as mail, peripherals, and databases) are available to the individual telecommuter or to the satellite office. It enables NeXT computers to run the Internet Protocol (IP)—and the thousands of software packages that depend on that protocol—over telephone lines. Teleconnect provides a significant improvement over conventional PC- and Macintosh-based communications packages, and allows NeXT users to enjoy the benefits of NeXT applications and multitasking. For example, the user can simultaneously transfer files, log on to multiple machines on a remote office network, and work with NeXT applications such as NeXT Mail, Lotus Improv, and WordPerfect.

Marble Associates, Inc.

1012 Teleconnect	\$249.
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Call 1-800/800-NeXT to order.



POWER DRAWING FOR EVERYONE.

TOPDRAW

Graphics for every skill level. Regardless of your artistic talents, you'll appreciate **TopDraw's** comprehensive graphic tools and PostScript output. Casual users can create high-impact diagrams, charts, and graphs. For advanced designers, TopDraw provides sophisticated layout and illustration capabilities, including tools for importing, editing, and integrating continuous-tone raster images.

Select design objects to draw lines, rectangles, squares, circles, ellipses, arbitrary polygons, and smoothly curved shapes—all automatically. Shapes may be filled with spot color, shades of gray, or pattern then layered, scaled,

rotated, "zoomed", and skewed. Graded tones, opacity control, and user-definable dash patterns and line width are also available.

Add text in any size, at any angle, within objects, or along any path. (You can cut and paste text from *WriteNow* and *FrameMaker*.) Change fonts, stroke width, spacing, justification, and margins for individual letters or complete paragraphs. And TopDraw lets you edit text even after graphic manipulation, making sophisticated effects easy to create and change.

TopDraw imports images from a host of scanners as well as PostScript, Encapsulated PostScript (EPS), Tagged

Image File Format (TIFF), Maker Interchange Format (MIF), and Rich Text Format (RTF) image files. Scale, crop, skew, rotate, and adjust raster images for brightness and contrast before they're placed in layouts. And when you're ready to show your top-drawer TopDraw graphics, mechanicals and films may be output on a range of devices, from laser printers to sophisticated PostScript color image setters.

Media Logic

9987 TopDraw 1.0C. \$459.

OPTICAL & FLOPPY DISKS

Don't get caught short. One of the laws of computing seems to be that you never have enough blank disks when you need them. Well, whether you rely on 2.88 floppies or optical disks for your daily (and backup) storage requirements, we can keep you well stocked.

512 MB Optical Cartridge are designed specifically for the 68030 and 68040 cube and have 256 MB available on each side for a total of 512 MB of storage per disk. For NeXT floppies, we have dependable **Toshiba 3½" ED Diskettes**. Just format and then fill them with all the application and data backups you need to run a nice, safe, secure operation.

Canon ... 90 day MBG

9811 512 MB Optical Cartridge (MO-502m) \$175.

Toshiba ... lifetime warranty

9754 Toshiba 3½" ED Diskette (Qty. 1) 8.

9755 Toshiba 3½" ED Diskettes (Qty. 10) 79.

16 MEG UPGRADE KIT

The more the merrier. Once you start multitasking a host of high-end applications, 8 Meg of RAM can start filling up really fast. That's when it's time to get a NeXTConnection **16 Meg Memory Upgrade Kit**. It consists of four 4 MB, low-profile, non-parity, 80 ns SIMM modules that are compatible with the 68030 and 68040 cube and the 040 workstation (monochrome only). You can install them yourself in the cube (and we provide toll-free tech support), but you risk voiding the warranty if you do so in the workstation so we recommend having an authorized dealer do it for you. Either way, it's the inexpensive fast track to more NeXT power.

Memory ... 2 year warranty

8911 16 Meg Memory Upgrade Kit \$795.

1935 8 Meg Memory Upgrade Kit (for NeXTstation Color) 699.

DOVEFAX

Is it a fax? Is it a modem? Yes! Yes! Whether you've got a computer-generated file to fax or data to send, **DoveFax Desktop for NeXT** has the solution. In short, it's an external serial device featuring a 9600 baud fax modem and a 2400 baud Hayes-compatible data modem. The fax features true background operation, an on-line telephone directory, on-screen display of faxes, automatic answering, customized cover pages (with graphics and text), fax preview, and Display PostScript imaging. The modem can be used with a variety of communications services, telecommunications applications, and electronic bulletin boards. It's easy to install and use and, like all Dove products, is backed by a one-year warranty.

Dove Computer ... 1 year warranty

9356 DoveFax Desktop for NeXT (includes 2400 modem) \$395.

OT PALETTES

Increase your development power. And save money, too, by dramatically reducing programming time. Use **OT Palettes 2.0**, the first objects created by the only commercial custom palette developer for NeXT's Interface Builder. **SmartField** is an advanced text field formatting and character validation object. **Math** provides front-end development tools for *Mathematica*. **Graph** allows fully interactive graphs to be incorporated into custom applications. **Chooser** is a scrolling selection list. Call NeXTConnection for more information.

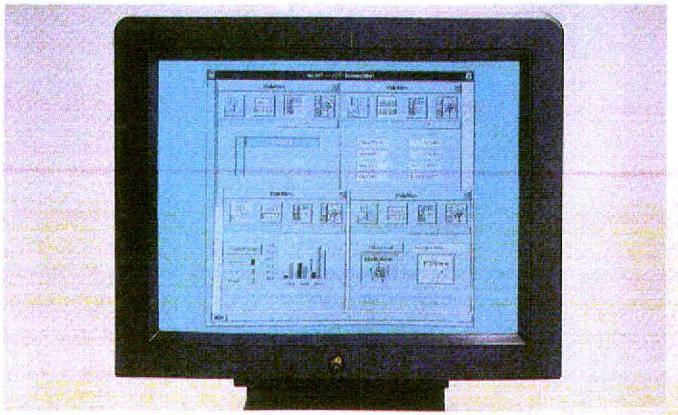
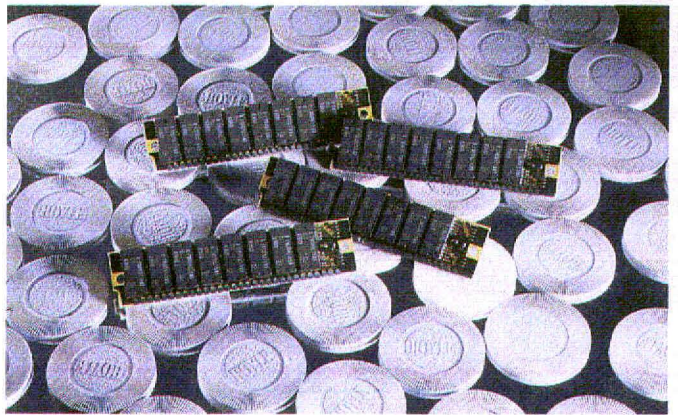
Objective Technologies

9345 [OT Palette: 2.0] SmartField \$650.

9346 [OT Palette: 2.0] Math 650.

9344 [OT Palette: 2.0] Graph 1259.

9347 [OT Palette: 2.0] Chooser 429.



Call 1-800/800-NeXT to order.

NeXTConnection™

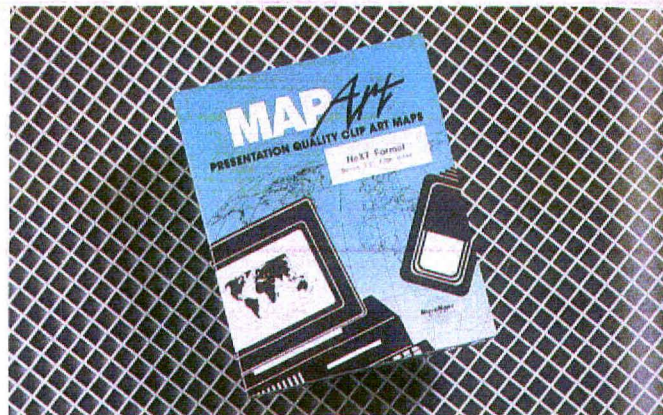


PERIPHERAL LAND DRIVES

Sophisticated storage solutions. PLI's **SuperFloppy 2.88** gives you the convenient high capacity of the latest drive standard along with complete read/write/format compatibility with 720K and 1.44 Meg disks. And it has a SCSI interface for easy connection to any NeXT. The **Infinity Turbo 40** won an Eddy award from *MacUser* because it combines the unlimited storage capacity of removable cartridges, the reliability of the SyQuest mechanism, and a 20ms access time that rivals high-end hard drives. There's also a two-slot **Infinity Twin** model available. So whether you need a 100%-compatible 2.88 floppy or a super-fast 45 Meg removable-cartridge drive (or both), head for Peripheral Land.

Peripheral Land, Inc. ... 1 year warranty

8547 SuperFloppy 2.88	\$449.
8893 Infinity Turbo 40 MB Cartridge Drive	749.
8894 Infinity Twin 40 MB Cartridge Drive	1325.
6592 Syquest Cartridge (40 MB)	74.



MAPART

Maps for desktop publishing and graphic design. Imagine over 5 MB of high-quality map graphics at your fingertips! With **MapArt**, you get a comprehensive map collection that makes it easy to create attractive map graphics for brochures, newsletters, and presentations. Customize maps with *Adobe Illustrator* or import as background images in most NeXT applications. Maps feature country/state borders, latitude/longitude lines, and country/city names. Since each feature is a separate object, you can select areas, modify text, and add drop shadows and graphics to create your own design. MapArt includes four world maps, 12 regional maps of all world continents, plus detailed maps for 24 major countries that show state/province boundaries.

Micro Maps

9276 MapArt 1.0	\$95.
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OBJECTIVE DB TOOLKIT

Get friendly with SYBASE. A boon for developers, **Objective DB Toolkit** fills the gap between the SYBASE database engine and applications. This versatile object library provides higher-level access to the Structured Query Language and Links the SQL Server with Interface Builder. It offers extensive templating for TextFields and mapping of palette objects to data types, letting you add functionality to data types. The Toolkit accommodates text, image, and sound data and supports pop-up lists as well as text, buttons, and slider arrays.

Field definition requires no programming and field characteristics may be modified dynamically. Each window and field may be set up to trigger specific database access or processing commands. The Toolkit also provides automatic data transfer to screen fields and generates data portions of SQL insert and update statements.

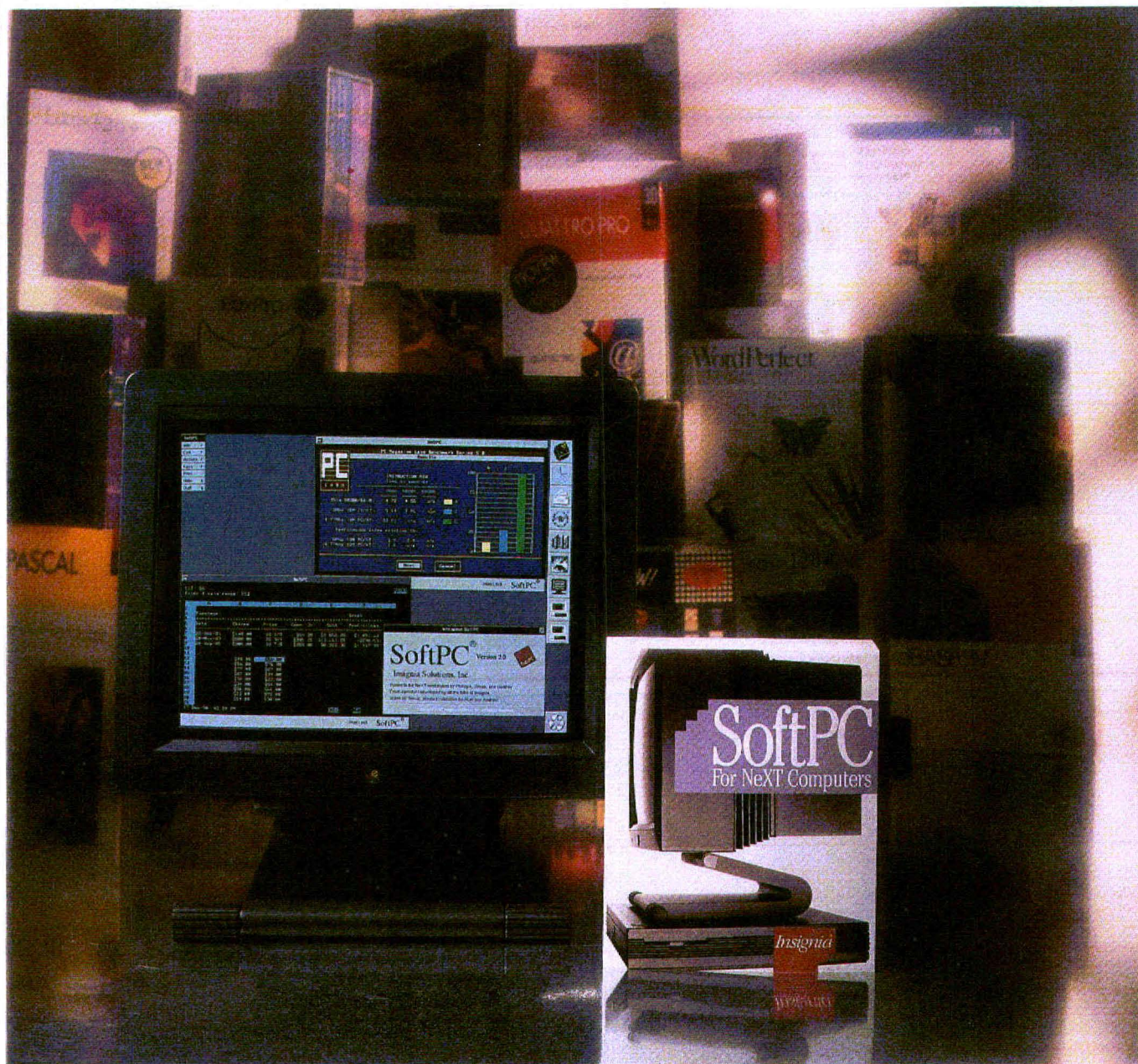
For easy manipulation of sound messages, you can associate a sound interface with database variables. And a browsing facility—loaded directly from an SQL statement—can print browser contents with no programming required. And fully multilingual applications are easily generated.

Professional Software

9357 Objective DB Toolkit 2.0	\$895.
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OPEN THE DOOR TO DOS.

SOFTPC

It's a PC-on-a-disk! Now you can run any MS-DOS application on your NeXT system with **SoftPC**, the software-based PC emulator. If you depend on a specialized PC program or PC datafile—or have PC-based co-workers—SoftPC can make platform hopping simple and fast. It'll also help you protect your investment in DOS software and training. As *NeXTWORLD* said, "This undertaking is so important and so difficult, and SoftPC succeeds so well at it, that SoftPC ranks as one of the most important programs for the NeXT."

SoftPC duplicates an IBM PC/AT with 80286 and 80287 processors, offering C: and D: drives, MS-DOS 3.3 (you can

install 4.0), and support for EGA and CGA video in monochrome and color. There are two printer ports and two communication ports that can be directed to NeXT serial ports or to any UNIX device, process, or file. SoftPC will even transform your NeXT mouse into a Microsoft mouse on the screen.

SoftPC's special features give DOS applications a boost in performance and versatility. NeXT and DOS software can run side by side and share files as easily as copying them. NeXT modems, printers, floppy drives, CD-ROM, scanners, and other peripherals are available to your PC program. And for mega-applications, SoftPC opens up an astounding

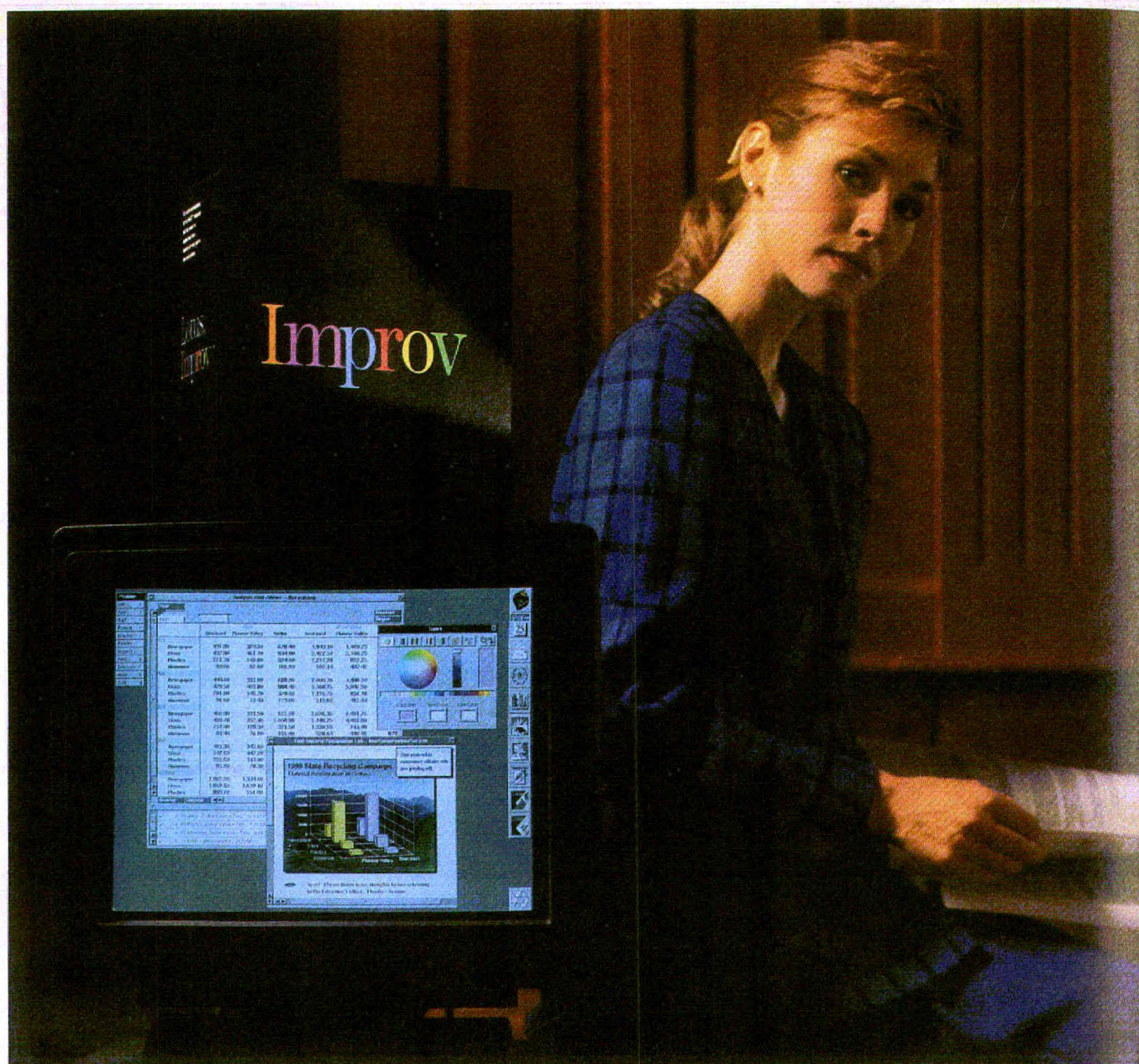
32MB of RAM to your DOS programs.

While SoftPC will work on any system running NeXTstep 2.0, a 68040 processor is recommended. Get the power of the NeXT with the rich application library of DOS—isn't that what you've been waiting for? Well, you can have it all with SoftPC.

Insignia Solutions

1456 SoftPC 2.0 \$329.

Call 1-800/800-NeXT to order.



LOTUS REINVENTS THE SPREADSHEET.

LOTUS IMPROV

Look at your data in a whole new light. What happens when you give the creators of the world's best-selling spreadsheet an 040 processor, 8 Meg of RAM and let them improvise to their heart's content? You get **Lotus Improv**, a revolutionary spreadsheet for analyzing, viewing, and presenting your data in ways never before possible.

The unique dynamic views feature of Improv lets you see the same data in multiple ways to explore data relationships and prepare targeted reports. Just use the mouse to rearrange your spreadsheet and get a whole new view instantly, without any re-keying. You can actually work with 12 different

dimensions of data at once, displayed in 2D or 3D format.

Improv lets you use plain English to define cells and create formulas (e.g., "Dollars³ Tons x 12.5"). So your spreadsheets document themselves and are easy to modify or re-use. And for complex formulas, you can call on a host of built-in Lotus 1-2-3-style functions. All of which makes it easy to build spreadsheets from scratch. And you can also use the extensive collection of prepackaged templates, and/or import existing 1-2-3 files directly.

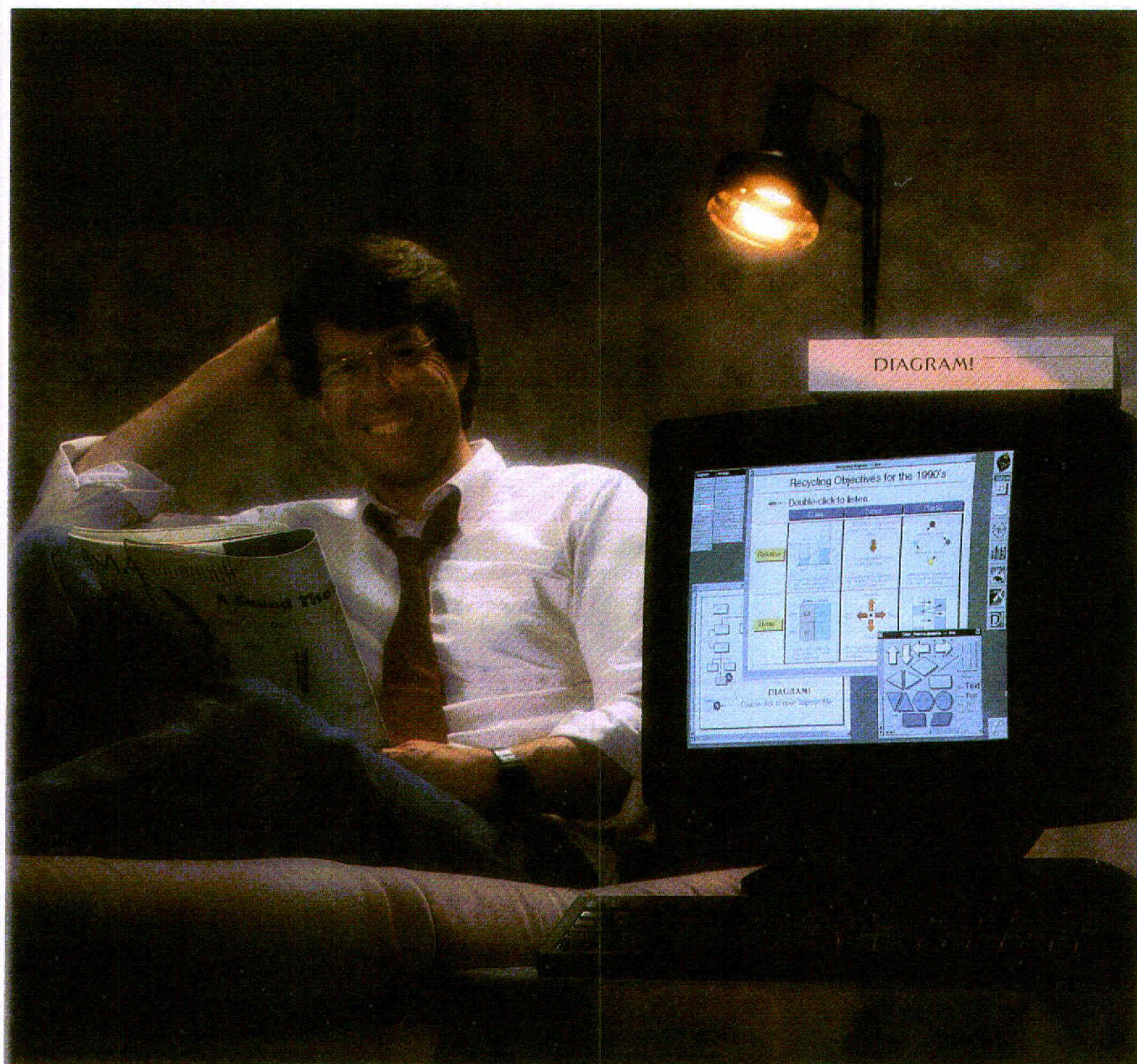
Ready to show off your stuff? Improv lets you combine graphs, texts, images, and even sound with stunning clarity and resolution that takes full advantage of NeXT.

How good is it, really? *Byte* (10/90) wrote, "Improv knocked me out." *PC World* (11/90) called it "a stunningly simple approach to organizing complex data." And *What Micro? Magazine* (UK, 4/91) awarded it "Most Innovative Product 1990."

Lotus Development

9794 Improv 1.0 \$549.

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GRAPHICS FOR PEOPLE WHO USE THEM EVERY DAY.

Diagram!

Diagram! packs graphics power and production. Do you use graphics in your business? To get your message across fast and with high impact? **Diagram!** is a new kind of presentation graphics package that lets you combine drawings, data, sound, and even files from other applications quickly and effectively. Just double-clicking in your Diagram! drawing will open *Improv* spreadsheets, reveal *WordPerfect* or *FrameMaker* documents, or play back voice recordings. Setting links is as easy as dragging in a file and dropping it.

Diagram! is a full-featured graphics application with all the

extras to make drawing, revising, and presenting information a snap. With customizable symbol palettes, you're freed from switching back and forth between conventional tools. Instead, you point to shapes and drag them into your document. If you don't see what you need, modify your palette and you've instantly customized Diagram!. Overall, it's one of the biggest innovations in drawing technology since the Macintosh.

In addition, once you've drawn a line between objects, Diagram! takes over: "rubberbanding" lines to automatically maintain organizational charts, process flows, or decision trees—any structured drawing. That's right, this is a graphics program designed for people who use them every day.

By the way, you don't have to be in business to enjoy the power of Diagram!—students and universities have proven to be big fans also. Ask about the special educational discounts available.

Lighthouse Design, Ltd.

8621 Diagram! 1.0 \$339.

Call 1-800/800-NeXT to order.

Corporate Accounts Welcome

Yes, we gladly accept P.O.s. Always have, always will. In fact, we do everything possible to make corporate mail-order purchasing of computer software and peripherals as easy and enjoyable a process as possible—within the realm of common decency, of course. Many companies (including most of the Fortune 1000 and other just-as-fortunate smaller ones) have accounts with us. If you'd like to open one (or check whether your company already has one), simply call our order line at 800/800-NeXT.

PRODUCT INDEX

PUBLISHING & GRAPHICS

Item#	Manufacturer	Price
Adobe (See page D)		
1827	Adobe Illustrator 3.0	\$459.
9765	Plus Pack 1.0	129.
9741	TouchType 1.0	175.
1832	Adobe TypeSet 1.	65.
1833	Adobe TypeSet 2.	65.
1834	Adobe TypeSet 3.	129.
Lighthouse Design, Ltd. (See page L)		
8621	Diagram! 1.0	339.
8660	Diagram! 1.0 (optical media)	469.
Media Logic (See page G)		
9987	TopDraw 1.0C	459.
Micro Maps (See page I)		
9276	MapArt 1.0	95.
Stone Design		
8658	TextArt 1.0	319.
8666	TextArt 1.0 (optical media)	549.
T/Maker		
1185	ClickArt 1.0	195.

RECREATIONAL

Athena Design		
9457	Culture Shock 1.0	22.

GENERAL BUSINESS & PRODUCTIVITY

DIT ... 1 year warranty (See page C)		
8657	On Duty 1.0	209.
Imagine, Inc. (See page E)		
1396	MediaStation 1.53	799.
1397	MediaStation 1.53 (5 pack)	2995.
1398	MediaStation 1.53 (20 pack)	8995.
1400	MediaStation Educ. Package	295.
1394	MediaStation Educ./Ntwk. Pkg.	2749.
Insignia Solutions (See page J)		
1456	SoftPC 2.0	329.

Lotus Development

(See page K)

9794	Improv 1.0	\$549.
WordPerfect (See page F)		
8818	WordPerfect 1.0.1	329.
8859	WordPerfect (5 user)	1249.
8928	WordPerfect (20 user)	3699.

PROGRAMMING & MATH TOOLS

Absoft

8898	Fortran 77 3.0	839.
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Objective Technologies

(See page H)

9347	[OT Palettes: 2.0] Chooser	429.
9344	[OT Palettes: 2.0] Graph	1259.
9346	[OT Palettes: 2.0] Math	650.
9345	[OT Palettes: 2.0] SmartField	650.

Professional Software

(See page I)

9357	Objective DB Toolkit 2.0	895.
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Triakis

1966	DAN, the Data ANalyzer 2.0	269.
1965	Math++ 3.0	199.
1963	T-Calc 1.0	59.

Wolfram

2516	Mathematica 2.0	1295.
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AUDIO & VISUAL PRODUCTS

Metaresearch ... 1 year warranty

9682	Digital Ears	499.
9683	Digital Ears (with Soundworks)	669.
9681	Digital Eye	829.
9680	Soundworks	269.

COMMUNICATIONS & DATA TRANSFER

Marble Associates, Inc.

(See page F)

1012	Teleconnect	249.
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Abaton ... 1 year warranty

8665	InterFax 24/96 (fax/modem)	479.
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Dove Computer ... 1 year warranty

(See page H)

9356	DoveFax Desktop for NeXT (includes 2400 modem)	395.
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Hayes ... 2 year warranty

2307	Smartmodem 2400	349.
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6655	V-Series 2400 Modem	\$449.
5991	V-Series 9600 Modem	539.
7391	Ultra 9600 Modem	669.

Intel ... 5 year warranty

5119	2400EX Modem	179.
7880	9600EX Modem	529.
6420	2400EX MNP Modem	229.

Prometheus

2197	ProModem 9600N (V.32)	769.
2207	ProModem 24/96 NSR (fax modem)	339.

Telebit ... 1 year warranty

8907	T2500 Modem	939.
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CONNECTIVITY

Data Viz

1823	MacLinkPlus/PC 5.0	129.
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DIT ... 1 year warranty

(See page C)

8656	FloppyWorks	185.
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UTILITIES

Agog, Inc.

(See page F)

1476	Squash! 1.0	79.
1478	Squash! 1.0 (10 pack)	699.
1479	Squash! Educational 1.0	49.
1481	Squash! Educational 1.0 (10 pack)	429.

Teledia

2513	Backup Master 1.0	249.
2514	Phrase Player 1.0	129.

DRIVES & CABLES

Cables ... lifetime

8906	SCSI 2-50 Pin Centronics (4 ft.)	45.
8992	68030 Modem Cable (8 ft.)	15.
8991	68040 Modem Cable (8 ft.)	15.
8908	SCSI 1-50 Pin Centronics	12.
8909	50 Pin-50 Pin Centronics	15.
1106	SCSI Terminator	29.
1540	Mini DIN 8 to Mini DIN 8 Null Modem Cable	15.
1441	Mini DIN 8 to DB25 Null Modem Cable	15.

DIT ... 1 year warranty

(See page C)

8661	CubeFloppy 2.9 (with FloppyWorks)	579.
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Micropolis ... 2 year warranty

8984 280 MB Ext. Hard Drive (15 ms)	\$1629.
8979 280 MB Int. Hard Drive (15 ms)	1429.
8978 550 MB Int. Hard Drive (16 ms)	2099.
8919 860 MB Int. Hard Drive (15 ms)	2949.

Peripheral Land, Inc. ... 1 yr. wrnty.

(See page I)

8887 Caddy for CD-ROM Drives	19.
8899 CD-ROM Drive	795.
8890 1.2 GB Ext. Hard Drive (15 ms)	4679.
8891 320 MB Ext. Hard Drive (11 ms)	2395.
8892 635 MB Ext. Hard Drive (12 ms)	4329.
8888 300 MB Ext. Hard Drive (17 ms)	2049.
8889 600 MB Ext. Hard Drive (17 ms)	2695.
8893 Infinity 40 MB Cartridge Drive	749.
8894 Infinity Twin 40 MB Cartridge Drive	1325.
8905 SCSI 2 to Centronix Cable (50 pin)	49.
8547 SuperFloppy 2.88	449.

SCANNERS

Abaton ... 1 year warranty

8665 InterFax 24/96 (fax/modem)	489.
8620 300/GS Scanner	
(requires Interface Kit)	995.
9449 Interface Kit (for 300/GS)	475.

ACCESSORIES

American Power ... 2 year warranty

7105 Smart-UPS 600	469.
9365 Smart-UPS 900	669.
9364 Smart-UPS 1250	879.
9366 Smart-UPS 2000	1339.
7107 Back-UPS 450	279.
7106 Back-UPS 520	329.
7105 Back-UPS 600	469.

OUR POLICY

We accept VISA and MASTERCARD. No surcharge will be added for credit card orders. Your card is not charged until we ship. If we must ship a partial order, we never charge freight on the shipment(s) that complete the order (in the U.S.). No sales tax is charged, except for Ohio residents (please add applicable tax). All U.S. shipments are insured at no additional charge. APO/FPO orders are shipped First Class Mail. There is a \$250 minimum on international orders in U.S. dollars. Manufacturer support and upgrade eligibility may be limited outside the U.S.A. Upon receipt and approval, personal and company checks clear the same day for immediate shipment. Corporate P.O.s are accepted subject to credit approval. The maximum for C.O.D.s is \$1000 (company check, cashier's check, or Money Order). There is a 120-day limited warranty on all products. We will replace defective software immediately. We will replace or repair defective hardware at our discretion. All items are subject to availability. Prices and promotions are subject to change without notice. Our order lines are open continuously from 8:00 a.m. Monday until midnight Friday, ET. You can call our business offices at 603/446-7771 Monday through Friday 9:00 a.m. to 5:30 p.m. ET.

7110 Back-UPS 800	\$599.
7109 Back-UPS 1200	799.

Avery

4808 1 1/8" x 4" Laser Labels (Qty. 1400)	24.
4812 1/2" x 1 3/4" Laser Labels (Qty. 2000)	7.
4807 1" x 2 5/8" Laser Labels (Qty. 3000)	24.

Canon ... 90 day warranty

(See page H)

9811 512 MB Optical Cart. (MO-502m)	175.
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Curtis Manufacturing ... lifetime

1707 Ruby (SPF-2)	55.
1708 Ruby Plus (SPF-2+)	65.
5832 Ruby Remote (SPFR-2)	65.
5985 Safe Fax (SF-1) (1 year warranty)	19.
9757 Top Shelf (TS-1)	18.
1713 Filtered Safe Strip (SPF-3) (1 year warranty)	24.
1718 3 1/2" Disk File (DB-2) (holds 40)	8.

Hewlett-Packard ... 120 day wrnty.

8099 Toner Cartridge for NeXT Printer	95.
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Kensington ... 1 year warranty

4971 Modem/Fax Protector 20	25.
4972 Power Tree 10	19.
4973 Power Tree 20	27.
4974 Power Tree 50	54.
5577 PowerBacker 450 (2 yr. warranty)	299.
5578 PowerBacker 520 (2 yr. warranty)	349.
5230 PowerBacker 800 (2 yr. warranty)	649.
5228 PowerBacker 1200 (2 yr. warranty)	829.

Maxell ... 60 day MBG

2793 DS/HD 3 1/2" 1.44 MB Diskette (Qty. 10)	21.
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Memory ... 2 year warranty

(See page H)

8911 16 Meg Memory Upgrade Kit	795.
1935 8 Meg Memory Upgrade Kit (for NeXTstation Color)	699.
9284 1 MB SIMM (80ns, set of 4)	189.

8790 1 MB SIMM (80ns)	\$49.
8910 4 MB SIMM (80ns)	199.

Moustrak ... lifetime warranty

8576 Black Mouse Pad (7" x 9")	8.
8548 Black Mouse Pad (9" x 11")	9.
2694 Blue Mouse Pad (7" x 9")	8.
2692 Blue Mouse Pad (9" x 11")	9.
2693 Blue Low Friction Mouse Pad (9" x 11")	10.
2699 Gray Mouse Pad (7" x 9")	8.
2697 Gray Mouse Pad (9" x 11")	9.
2698 Gray Low Friction Mouse Pad (9" x 11")	10.

Pacific Micro ... 1 year warranty

8244 External Hard Drive Enclosure	469.
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Safe Power Systems ... 2 yr. wrnty.

1948 PowerBacker 300	199.
4563 PowerBacker 500	419.
6747 400S Power Backup	399.

Sony ... 60 day MBG

3298 DS/HD Disks 3 1/2" 1.44 MB (Qty. 10)	18.
6375 DS/HD Disks 3 1/2" 1.44 MB (3 pack) (Qty. 30)	49.

SyQuest

6592 Syquest Cartridge (40 MB)	74.
9728 Syquest Cartridge (40 MB) (10 pack)	699.

Toshiba ... lifetime warranty

(See page H)

9754 Toshiba 3 1/2" ED Diskette (Qty. 1)	8.
9755 Toshiba 3 1/2" ED Diskettes (Qty. 10)	79.

3M ... lifetime warranty

9802 DS/ED Disks 3 1/2" 2.88 MB (Qty. 10)	79.
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Tripp Lite ... 2 year warranty

7890 750W Battery Backup	469.
7889 1200W Battery Backup	669.
6018 LC1200 Line Conditioner	159.
6017 LC1800 Line Conditioner	209.

SHIPPING

Continental U.S.: Barring events beyond our control, all credit card orders phoned in weekdays by 3:15 a.m. ET will ship Airborne Express for delivery the next business day. Which means same day delivery for orders placed between midnight and 3:15 a.m. ET. (Some orders may ship by UPS Ground for next day delivery.) Saturday delivery is available to many areas upon request. Some areas require an additional day for delivery. The total freight charge on any non-C.O.D. order placed with NeXTConnection is only \$3. C.O.D. orders will ship for \$8. **Hawaii, Alaska, Canada, Puerto Rico, and U.S. Virgin Islands:** Call 800/800-NeXT for information on shipping and charges. **All other areas:** Call 603/446-7771 or FAX 603/446-7791 for information.

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Call 1-800/800-NeXT to order.

USERS Graphic Charts in Adobe

by TONY BOVE &
CHERYL RHODES

the type of image-based infographics commonly used in major newspapers and magazines.

Illustrator version 3.0 provides six different graph styles: grouped column, stacked column, pie, line, area, and scatter. Graph data can be either typed into a table provided by Illustrator or imported from a spreadsheet or database file, and graphs will update automatically if the data changes.

The simplest graph

The graph tool at the bottom of Illustrator's tool palette starts on the grouped-column graph style. Clicking the arrow next to the graph tool reveals other styles to choose from. You can also choose styles from the Graph Style option in the Graph menu.

To create a grouped-column graph from scratch, open a new file with no template. When the window opens, select the graph tool and drag diagonally across the drawing area to define the size of the graph. A Graph Data window opens, letting you enter data into a ready-made spreadsheet structure. Start by entering the data shown in Figure 1. When you're finished, click OK.

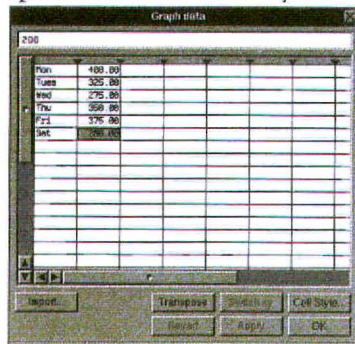


Figure 1. Illustrator's Graph Data window appears automatically when you select a graph type from the tool bar. Enter these values to create the graphs in these examples.

While the graph is still selected, you can make changes to it, such as changing the type size of the text in the graph (using the Size command in the Type menu). You can also edit specific parts of the graph, changing the size of some text, or changing the pattern or paint style of a section. You'll see how later.

Graphs plus graphics

In Illustrator 3.0, you can enhance the simple bar chart you've just created by using graphic objects in place of the bars. Any EPS object can fill columns of a bar chart or be used as markers in line graphs and scatter charts.

Now that the graph is drawn, you temporarily leave the graph window and prepare the graphic that you'll be using in your chart. To do that, open the file of the graphic you want to use and select the object, either by using Select All in the Edit menu or by dragging a selection marquee

A graph works better to convey numeric comparisons than even the clearest paragraph or table – and a graph that incorporates icons or other images into its structure is better still. The graphic adds not only information but extra color, shape, and interest. A new feature in Adobe Illustrator 3.0 lets you incorporate drawn (EPS) images into graphs. This permits users to build

around the object with the selection tool. (We're using a graphic of a coffee cup for this example. You can use any Illustrator document you have handy.) Then choose Group from the Arrange menu, and, with the rectangle tool, draw a rectangle around the object to define a bounding box, which tells Illustrator to use the entire image. Paint the rectangle with no fill and no stroke (using the Paint Style command), and use the Send to Back command in the Edit menu to place the rectangle behind the object.

Next, select the bounding box and image and use Group to group them. Choose Define Graph Design from the Graph menu, and click the New button. A small preview of the design appears, and you can save the altered object under a new name.

Direct selection

Graphs are organized into subgroups. You can make changes to individual sections of the graph in two ways. You can ungroup the segments of the graph and manipulate the segments individually, but the ungroup operation also deactivates the connection between the graph and the underlying data so that the graph will not be updated when the data is changed. It's best to leave a graph grouped and use Illustrator's direct-selection method, which is designed to let you keep the graph elements grouped. You'll use the direct-selection tool to select the bars of the graph and assign a graphic design to them.

Click the arrow to the right of the selection tool in the tool bar and choose the white arrow – the direct-selection tool. Then hold down the Alternate key while you click on one of the columns of the graph to select a path. Alternate-click the same column again, and the related columns in the graph are automatically selected.

Now choose Use Column Design in the Graph menu and select the name of the design you just created. In other parts of the panel you can choose to scale the design vertically, to scale it uniformly, to repeat the

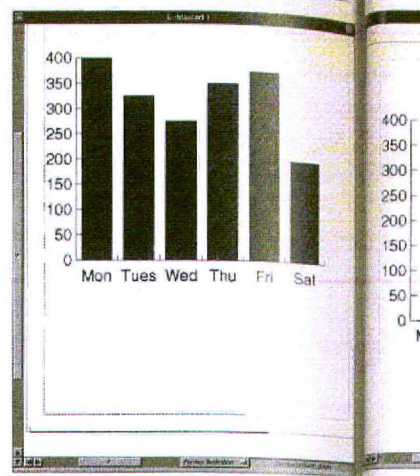


Figure 2. This simple bar graph will be embellished with graphics using Illustrator's direct-selection tool and an EPS file.

USERS NeXT Question

by DAN LAVIN

Q: My mailbox keeps getting larger and larger, and deleting old messages doesn't seem to help. My home directory is starting to resemble the judge's desk from *Miracle on 34th Street*. Help!!!

Robert Sibley
San Francisco, CA

A: When you delete a mail message, it disappears from your screen, but it's saved in the mail file, in case you want to retrieve it (with the Undelete command), much as with the recycler. To get rid of the deleted messages for good, select Compact under the Utilities menu item in the Mail application. This will save valuable space and speed up the mail application.

Hints and Tips

by CHUCK FARNHAM

Illustrator 3.0

Changing colors globally To quickly change a color anywhere it appears within a document, use custom colors to fill your objects. The custom color can easily be edited with the Custom Color command in the Paint menu. The changes will apply to all objects filled with that color.

Kerning To quickly obtain kerning and tracking information about specific characters within text blocks, select them with the text tool and then hold down the Alternate key. The kerning and tracking information will be displayed in the Info Bar.

Graphic tabs You can create graphic tabs for text blocks. Create a text box by clicking and dragging with the Text tool. Then, using the Pen tool, draw a vertical line (using the Shift key to constrain) or a non-vertical line where you would like the tab to be. Select both objects, then choose Make Text Wrap from the Type menu. Now when you enter or import your text, you can easily tab to the line.

Improv 1.0

Using groups and categories Whether you are creating a new model or modifying an old one, it helps to know how groups differ from categories in an Improv worksheet. To know which type of grouping to use, think about how you plan to use the worksheet model and which features have the highest priority.

For new Improv users, it's often confusing to decide whether to use categories or groups. Use the following rules to help you decide.

Use Groups if:

- Different groups can contain different numbers of items.
- You need to create unique combinations of items.
- You need a summary, such as total or average. Improv automatically creates the formulas to calculate these summaries.
- You want to be able to collapse or expand the information.

Use categories if:

- Every case will have the same structure of items.
- Items in different cases are calculated with the same formula.
- You need to be able to rearrange a view layout.

WordPerfect 1.0

Graphics Once you import a graphic onto a page, it almost always needs to be manipulated in some manner. With WordPerfect, once you have pasted the item onto the page (and while it is still selected), Command-click the graphic. This will bring up the Graphics Inspector, which gives you control over page alignment, background shading, 360-degree rotation, mirror imaging, and other manipulation tools.

CHUCK FARNHAM is a hardware-support engineer and consultant specializing in teaching computer skills to individuals with developmental disabilities.

design, or to set up a sliding design (in which only part of the object is scaled). For the coffee cup graph, we'll choose to repeat the design and set the design increment to 25. (We'll keep the defaults for the other settings.) You'll see the result in the Preview Illustration view (see Figure 3).

Different styles

One experiment you might want to try is changing the graph style. For example, you may want to present these numbers in a line graph. One of Illustrator's tricks is to use a design object to mark the data points in a line or scatter graph.

First, choose the regular (black) selection tool and select the entire bar graph. Then choose Graph Style from the Graph menu and select the Line graph style. A dialog box appears that shows various options and styles for line graphs. You may want to change the left axis range to 0 to 400 rather than 200 to 400—click the Use Left Axis button in the Axis section of the Graph Style panel and then the Left... button to change this range. Then click OK.

Next, scale each marker on the line graph so that the marker is an appropriate size; otherwise, you won't see the graphic, which is initially set to be the same size as a regular dot marker. Use the direct-selection

tool to select the first marker, then alternate-click the first marker to select all markers. Select only the markers, not the lines of the graph.

Now choose the Use Marker design option in the Graph menu, click the On data point option and enter the name of the design, and click OK. The result can be seen in the Preview Illustration view (see Figure 4). Note that we've added labels to finish the graphic.

You can use Illustrator's drawing and selection tools to modify the artwork and customize the graph. Just remember to use the direct-selection tool in order to keep the objects grouped. Any art director will tell you that coffee consumption is bound to change just before a deadline; using direct selection ensures that you can change those numbers in your graph data window at the last moment and have the graph automatically update, with all your special effects intact. ☛

JOHN BOVE AND CHERYL RHODES publish and edit a monthly industry newsletter, Bove & Rhodes Inside Report on Desktop Publishing and Multimedia. Bove and Rhodes have written many books about multimedia computing and desktop publishing.

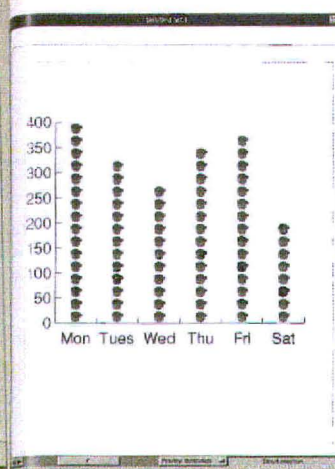


Figure 3. We've used coffee cups for the bars in a graph that shows coffee sales during one week.

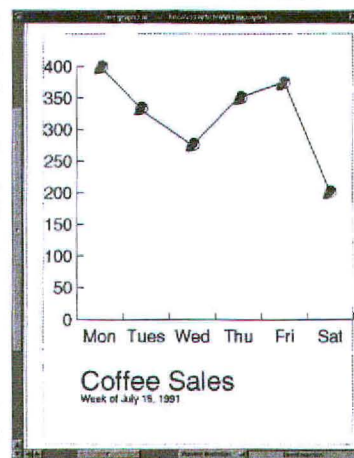


Figure 4. Using the same numbers and illustration in a line graph creates a different view of the data.

Designing an Icon

by KEITH OHLS

icons in the NeXT interface leave the user with an impression of what the application is all about.

In addition to purely aesthetic considerations, icon designers need to pay attention to an icon's effectiveness and its appropriateness to the NeXT user interface. A look at several existing logos shows examples to follow and mistakes to avoid.

Color and contrast

The 2-bit NeXT user interface supports four shades of gray: white, light gray, dark gray, and black. Icons are usually displayed on a light gray background. It's a good idea to use white highlights and dark shadows to build contrast and enhance the icon's visibility. Careful shading and rendering can result in a three-dimensional effect that can visually pop the icon off the light gray background. Draw, Librarian, and SoundPlayer are examples of icons that use these effects well. On the other hand, the TopologyLab icon is flat because it uses light colors and has no black to give it needed contrast.

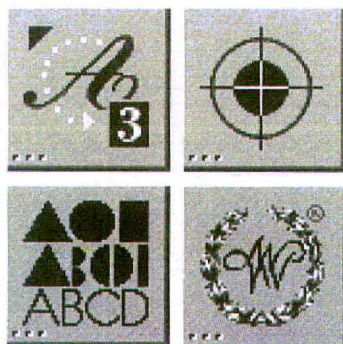
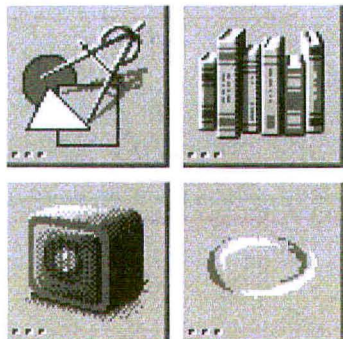
Often, the most elegant designs are the simplest ones. Icons don't have to be three-dimensional to be effective. Illustrator, Separator, TouchType, and Webster are examples of elegant and simple two-dimensional design.

Gray pixels can be used to anti-alias (smooth) the edges of jaggy parts of images, as in Adobe's Illustrator and Separator icons. The TouchType icon is a nice design, but using anti-aliasing to fix the jaggies in the lower half of the image could make the icon look even better.

Graphic strengths

Text isn't necessary in an icon; it's more important to establish a visual identity than to include the product or company name. Because the File Viewer displays the program name under the icon, the name within the icon is redundant. In many cases the name takes up

An application's "look and feel" begins with the first thing the user sees: the icon. Icons are a vital visual element in the NeXTstep user interface; they are used in the File Viewer, dragged in and out of programs, visible within many panels, and sent back and forth in electronic mail. The icon is the application's logo; it should establish an identity for the application it represents. The best



space that could otherwise be used to enhance the graphic. The name "Frame" in the FrameMaker icon detracts from Frame's nice logo, which would be more effective if it used the entire box. You see the same effect in the WordPerfect icon (which has a weaker graphic to begin with). Incorporating the name into the design is a better method. The Lotus Improv icon is a good example: Instead of conflicting with the image, the "Lotus" name complements it.

The transparency (or "alpha") of an icon affects how the icon highlights when the user clicks on it, as well as what it looks like when it is dragged around the workspace. Partially transparent icons highlight better because more of the white highlight shows through the icon. Transparency also lets the user see what's underneath an icon when it's dragged; a folder may be opening, the recycler may be spinning, and so on. Since the highlight color is white, it is important that an icon not contain too much white. The SoftPC icon is an example of an image that's hard to see when it's highlighted.

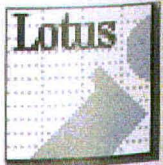
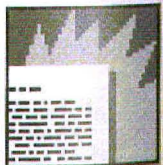
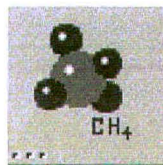
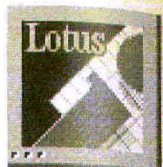
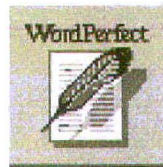
Other mistakes are purely graphic. The Scan-X icon, for example, suffers from poor rendering. The perspective of the scanner is not correct, and the shadow is awkward and cut off by the icon's boundaries.

Another common mistake is poor composition. The icon should fill out the 48-by-48-pixel area of the icon block. The two icons shown at the right are dwarfed by the text and icons around them when viewed in the File Viewer or the dock.

Document icons are as important as application icons. You usually have only one copy of an application, but you could have hundreds of files from that application, so the file icon could be scattered throughout the File Viewer. The look of the document icon should be similar to that of the application icon, visually tying the two together, though the file icon may look more like a document or other product of the application. WriteNow's and Improv's document icons are good examples of effective icons that fit these rules.

A poorly designed icon can be damaging for a new product, making the work look amateurish. Most of the applications on the NeXT have benefited from the input of professional designers – and have found it well worth the investment. Your application icon represents your program in the workspace that the user faces all day, and that's a powerful marketing opportunity for your product. ♦

KEITH OHLS designed the NeXTstep user interface.



Hints and Tips

Emacs in edit

Did you know you can use Emacs-like commands in Edit? My favorites are these:

Control-A	Move to start of line
Control-E	Move to End of line
Alternate-B	Move back one word
Alternate-F	Move forward one word
Control-D	Delete next character
Command-1	Select Line

For a complete list, see page 3-17 of the *NeXT Development Tools* documentation.

Emulating the AppKit

If only one object of a class is needed by your application, you can easily emulate the AppKit convention of using [ObjectClass new] to get at this object from anywhere in your code and guarantee that only one of these objects is produced. The OpenPanel and SavePanel are examples of this kind of object.

Here is an example for a TimeMonitor class, an object which can alert the user to the progress of some time-consuming event. Since only one such event can occur in a program that doesn't use Mach threads, we need only one time monitor.

Implementation TimeMonitor:Object

```
static id theMonitor = nil; // just one per class + new
{
    if (!theMonitor) {
        theMonitor = self = [super new];
        [NXApp loadNibSection:"TimeMonitor.nib" owner:self
         withNames:NO fromZone:[self zone]];
        // perform initialization of objects here
        // where you are guaranteed their existence
    } else self = theMonitor;
    return self;
}
```

Don't ever forget the second part of the "if" statement, or truly weird things will happen. Now, whenever you need the time monitor, you can use this statement:

```
theMonitor = [TimeMonitor new]; // just like the pros
```

An ounce of prevention

Compiler warnings are your friend; heed them carefully.

It's basic, but important. You're in for a lot of misery if you use a function that returns a float value but has not been prototyped in the file where it is used. The GNU Objective C compiler with NeXT modifications casts implicitly declared functions as returning type id (or void *). This type is the same size as a long int now (32 bits), but it's sure to break your code if this changes. Your float function will produce garbage, although the value looks perfectly valid "leaving" the

float function.

The default NeXT makefile used by Interface Builder (/usr/lib/nib/app.make) specifies use of the cc flag -Wall, which warns you if a function is used implicitly, if its return type is different than the prototype, if a variable is unused (nuke these), or if an automatic variable might be used uninitialized.

If you always address the compiler warnings, any new warning can be easily heeded and this pitfall avoided.

Got a hot tip? E-mail andrew@nextworld.com or call 505/345-4800. ANDREW STONE is a principal in Stone Design, publishers of the Create! and DataPhile applications for the NeXT.

NeXT Question

by PASCAL CHESNAIS

Q. Is the C++ shipped with the NeXT different than the C++ shipped with other platforms?

From Frequently Asked Questions (FAQ) at MIT

A. The C++ shipped with the NeXT 2.0 is actually "NeXT Release 2.0 (v31.1) - GNU version 1.36.4 (based on GCC 1.36)."

This version doesn't include libg++; you need to compile it. (GNU software is available from the Internet archive prep.ai.mit.edu.)

You should be aware of two things about C++ on the NeXT. First, any C include files have to be specified as below:

```
extern "C"
{
    #include <libc.h>
    #include <stdio.h>
    #include <stdlib.h>
    #include <math.h>
}
```

This tells the machine that the code is C++, so you won't have problems with the standard libraries thinking your program is Objective C.

The second difference is that the /usr/include/stdio.h in line 75 has a variable new that conflicts with a C++ keyword. You can redefine it using these lines:

```
#define new _new_
#include "stdio.h"
#undef new
```

These two fixes enable you to run C++ programs that do not use the C++ class library and therefore do not need libg++.

PASCAL CHESNAIS, a researcher at the MIT Media Lab, publishes FAQ on the comp.sys.next newsgroups.

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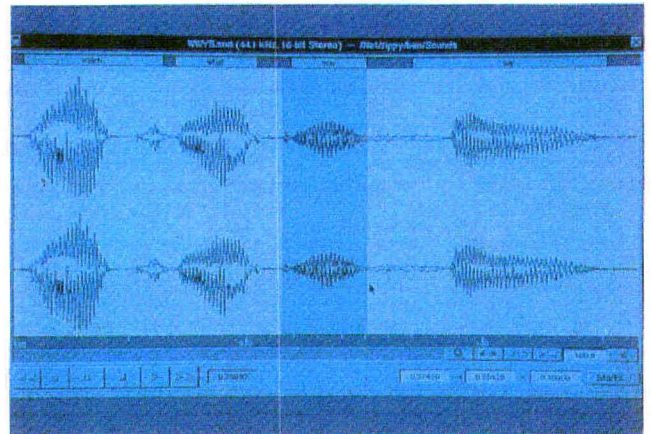
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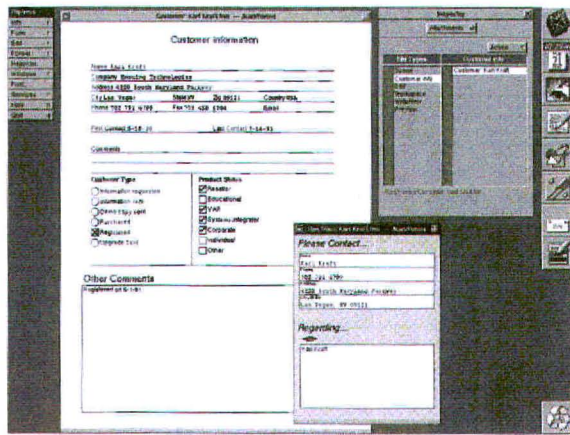
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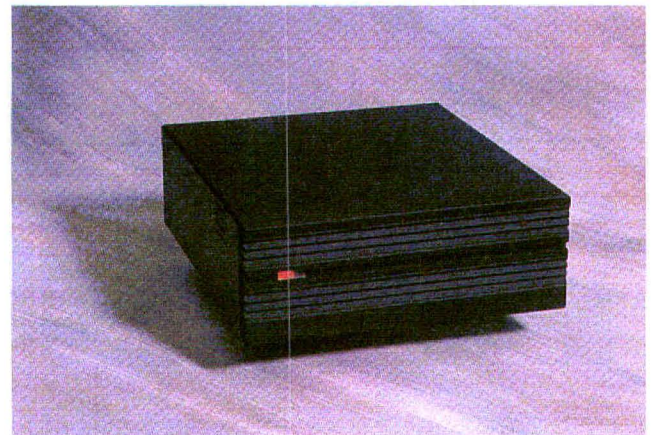


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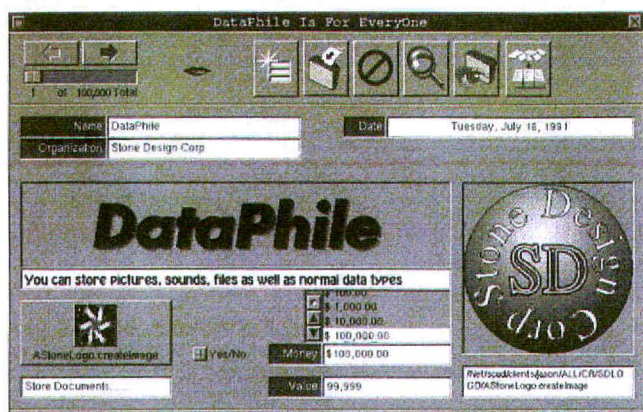
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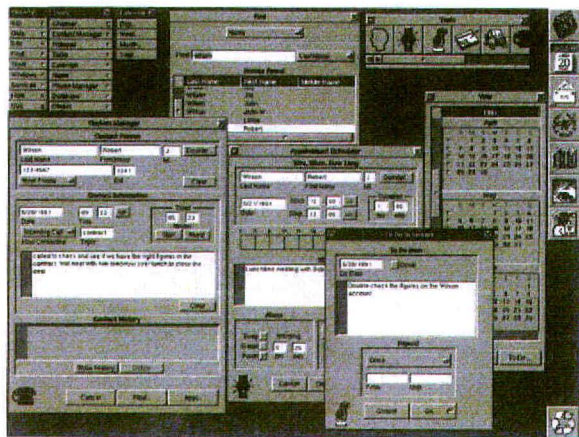


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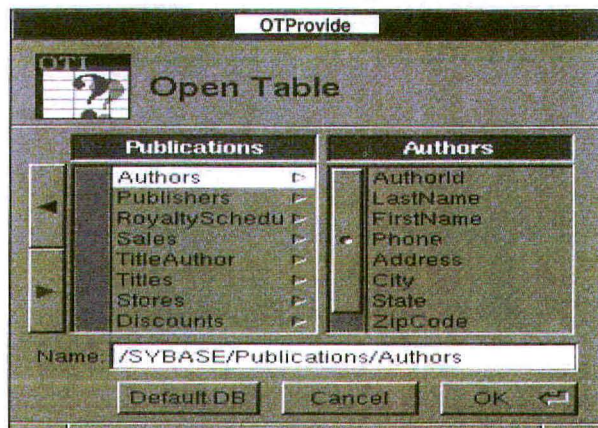
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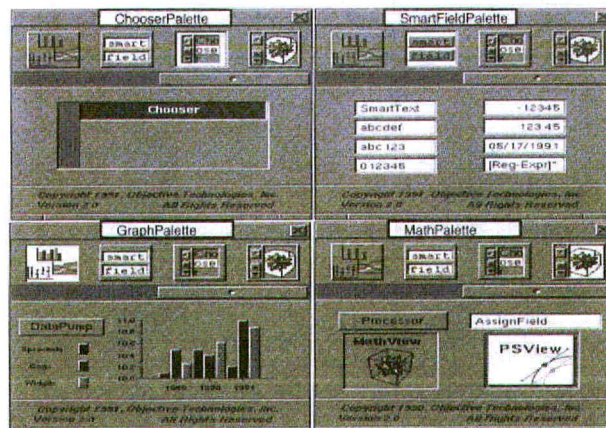
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FIRST CHICAGO

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First it was a gaggle of workstation vendors lining up as the Open Systems Foundation. Then we had another gaggle proclaiming the Advanced Computing Environment (ACE) alliance. The real mind-blower came a few months ago when Apple and IBM allied around an object-oriented operating system that they will propose as a new standard.

This outbreak of alliances among the power players of the computer industry is focused on the emerging intersection between PCs and workstations. What does it all mean for NeXT, which has already staked out that territory?

You can look at the PC-workstation intersection in two ways. Personal computers appeal to customers by solving their problems and making them feel comfortable. Workstations appeal to customers because their performance provides a competitive advantage in mission-critical applications. While the technology may be similar, the appeal to customers is entirely different. In that light, ACE systems are clearly workstations, intended to compete with Sun, while the Apple-IBM platform is intended to be the personal computer successor to the Macintosh and PS/2.

To consider whether a new platform will be successful, you have to ask: What is it that motivates customers to adopt a new platform? What must it have to make the customer happy?

First of all, a customer has to be confident that the platform has some staying power. Second, there has to be some new value in the platform, something that does not exist in previous platforms and that customers can use to do something that they want to do.

With ACE and Apple-IBM, let's assume that the market power of the alliance partners guarantees some staying power. But what is their new value?

When I ask that about ACE, I can't figure it out. Okay, they have a RISC chip. So does Sun. So does HP. So does IBM. RISC in itself doesn't have any value because everybody's got it. Same thing for the OS. Open Desktop looks pretty much like any other version of UNIX. And the things Microsoft has defined as valuable in Windows NT are exactly the same things that are already being delivered in UNIX.

The only thing that might be of value in some way is that MIPS has a 64-bit chip. That sounds like a unique differentiator, but we've been through this before. We went from 8 bits to 16 and from 16 to 32. If it turns out that a 64-bit chip is important, other people are going to get it, too. So I look at ACE and I don't see where the happy customer is.

When I look at the Apple-IBM alliance, I do see happy customers. The new value in this platform is the object-oriented operating system. Of course, everybody claims to be object-oriented, but the fact is that right now we don't have any operating systems that are truly object-oriented — with the possible exception of PenPoint.

There's something about the notion of object orientation that is really important: It creates a system that is theoretically infinitely extendable. It gives the user control over the system that they've never

had before, by truly enabling user programming. It also makes software developers happy because they can make software that is reusable. These are fundamental benefits. These are things that really motivate people.

Now we come to NeXT and look for its happy customers. Does NeXT make happy customers?

NeXT's original Cube demonstrated that NeXT had a vision for its architecture that was differentiated and unique. The NeXTstation demonstrated that the architecture had a future. It also has great software. If you add up Improv and TopDraw and Live Wire and Pages and the Boss Document Management System and Diagram! and others that I haven't seen, you get a pretty good collection of unique software.

On top of all this you have NeXT's software, particularly Interface Builder, one piece in NeXT's own approach to object orientation. Another is its new DBKit database object that lets you develop applications with

distributed SQL databases without programming. NeXT needs to go farther in this direction and evolve the Mach OS itself into a full object-oriented system, but fortunately it has a few years to do that.

That's the plus side for NeXT: It is a differentiated platform. It has software that is meaningful. It has a strategy and a point of view about computers. And it is becoming a serious company in terms of sales — upwards of \$50 million in revenues last quarter is more than respectable.

On the minus side is the marketing problem. Is NeXT a PC or a workstation? I think NeXT does itself a disservice talking about professional workstations and some murky concept combining the two. The value of the NeXT machine is the same basic value that PCs have had since the beginning. It benefits individuals, and by benefiting individuals, it benefits the organization. I have heard it said that Steve Jobs specializes in just-in-time mar-

keting, so I figure that by the time NeXT has ACE and Apple-IBM to contend with, NeXT will identify itself as a personal computer — just in time.

A more fundamental problem is NeXT's microprocessor architecture. The 68000 architecture is too far down its evolutionary path. The Motorola architecture is getting too complicated, and it will take Motorola too long to deliver new iterations.

I think NeXT is going to have to switch processors, which makes a real software compatibility problem for customers. There are all sorts of possibilities, but the problem is that getting on any other chip means you have to recompile all of your software.

I don't know the answer to that problem, which to me is the fundamental issue that NeXT now faces. If the company devises a solution that leaves the customer happy by providing continuity and increased power, then all its other advantages leave NeXT with a very bright future, ACE or no ACE, Apple-IBM or no Apple-IBM. ♦



Don't Worry, Be Happy

STEWART ALSOP

STEWART ALSOP is accustomed to switching hats. He is editor and publisher of P.C. Letter, host of the Agenda and Demo industry conferences, and editor-in-chief of InfoWorld, among other things.

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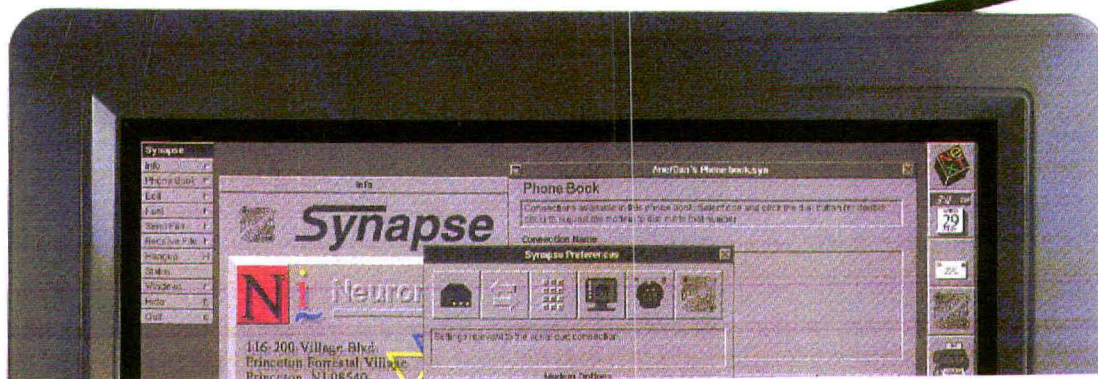
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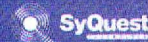
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NEWS IN BRIEF

Frame Technology is now shipping a new version of the leading page-layout program for the NeXT platform. **FrameMaker 3.0** offers a robust new tables package that integrates completely with the **FrameMaker** environment. Another new feature called **Conditional Text** allows you to simultaneously prepare multiple versions of a document by flagging sections and assigning conditions for omission and inclusion by version. **Color PostScript** output is finally supported, and completely new documentation is offered. **FrameMaker 3.0** costs \$995 (on floppies only) plus an optional \$195 for 13 international dictionaries. Upgrades for registered users are \$150. Phone 408/433-3311.

Steve Jobs, president and CEO of NeXT, has been named as one of 28 private-sector members of the President's Export Council, which advises the President on government matters affecting international trade. Jobs was chosen because of his "exemplary entrepreneurial role" and "outstanding leadership" in computers and technology, said Robert A. Mosbacher, secretary of the U.S. Department of Commerce.

Quark has put out official word that it has dropped development of its XPress page-layout program for NeXT. In response to inquiries from users, Quark replied with this written explanation: "The decision to support a platform is based on a number of factors, most notably the system's penetration into the professional publishing market. To date, NeXT has failed to make any real inroads into these areas. If this were to change, we would, of course, re-evaluate this decision."

Hayes Microcomputer and Marble Associates have collaborated to permit NeXT computers connected by modem to communicate with each other as if they were connected to the same LAN. The new Hayes adapter lets the NeXT connect at 38,400 baud through standard phone [SEE BRIEFS, PAGE 4]

WriteNow spun out to software start-up

New company plans full line of NeXTstep apps

by DAN RUBY AND DAN LAVIN

Redwood City, CA — In a move bearing some similarity to Apple's creation of Claris in 1987, NeXT this month granted an exclusive license to the NeXTstep version of Write Now and unspecified rights to other NeXT software to a start-up software publisher.

The new company, which was not yet named at press time, will begin selling WriteNow on October 1, the same date the word processor will be unbundled from the NeXT system. According to Randy Adams, president of the new firm, the company plans to be a major publisher of NeXTstep applications, with offerings in all major software categories.

"NeXTstep is our only business. We exist to help build the NeXT platform," Adams said.

Adams is the former president of Emerald City Software, which was sold last year to Adobe Systems. He was also formerly a NeXT [SEE WRITENOW, PAGE 2]

WriteNow's checkered past

- 1983 MacWrite for as-yet unannounced Macintosh is late. Steve Jobs contracts with Solaster of Seattle to write another word processor as backup.
- 1984 Apple finishes MacWrite and announces Macintosh. Apple has right to bundle WriteNow as possible advanced MacWrite.
- 1985 Apple decides it doesn't want WriteNow. Solaster continues to develop it as independent product. Steve Jobs leaves Apple and founds NeXT.
Jobs buys Solaster and hires programmers to finish WriteNow for Macintosh and NeXT.
- 1986 NeXT sells marketing rights for Mac and PC versions to T/Maker.
T/Maker releases WriteNow 1.0 for Mac.
- 1988 NeXTcube announced with WriteNow 1.0 bundled.
T/Maker releases WriteNow 2.0.
- 1989 T/Maker acquires development rights to Mac version.
NeXT ships NeXTstep 2.0 with WriteNow 2.0 bundled.
- 1990 T/Maker releases WriteNow 2.2.
- 1991 (October) WriteNow unbundled from NeXT system, shipped as shrink-wrapped product.

Unbundling leaves WordPerfect in a 'wait and see' mode

by SIMSON L. GARFINKEL

Orem, Utah – With the anticipated announcement of the unbundling of WriteNow, WordPerfect is likely to see a boost in sales beyond the 3200 copies the company said it has shipped to date. In the interim, the company is “in a wait and see mode” regarding NeXT development, said Tracy Powell, director of the NeXT software group.

Macintosh emulation nears

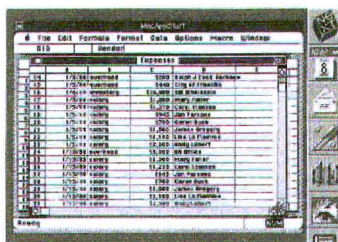
by DAN LAVIN

Albuquerque, NM – NeXT users may soon be able to run Mac software using a Mac emulation program – if its developer maintains its resolve to run the gauntlet of Apple's legal department.

NeXTWORLD obtained a copy of a Mac emulator, code-named **Executor**, developed by Abacus Research and Development (ARDI), which is based here. The program completely emulates a Macintosh window with pull-down menus, graphics, and mouse actions. Executor does not emulate the Macintosh Finder, however, so programs must be launched from a command line. Nor does Executor support System 7.0, color, or sound in its current version.

Clifford T. Matthews, ARDI president, said that Executor will be shown at UNIXopen in September and could ship in 1991, depending on legal and financing issues. Matthews claimed that the company followed stringent clean-room procedures in duplicating the functionality of the Mac ROMs without viewing or using any of Apple's code. "We've done things right, but we do anticipate legal action regarding look and feel," Matthews said.

Previously, efforts to clone the Macintosh have met with staunch



Code-named **Executor**, this Mac emulation program is shown running the Mac version of Excel.

legal challenges from Apple.

"If this could pass a legal challenge, which I doubt, there is no question that it would boost NeXT's position in the world," said Tim Bajarin, executive vice president of Creative Strategies of Mountain View, California.

There are thousands of programs on the [SEE EXECUTOR, PAGE 4]

Sum, SGI go downscale on workstations

by ELIOT BERGSON

Mountain View, CA – Two of NeXT's workstation competitors last month introduced lower-priced systems that may pose new challenges to NeXT's growing share of the professional workstation market.

Sun Microsystems introduced the monochrome SPARCstation ELC, a replacement for the company's SLC, starting at \$4995 for a diskless model – the same list price as a base NeXTstation. An ELC with a 200MB hard disk costs \$6295 – still within reach of potential first-time workstation buyers and those wanting to upgrade from PCs. Sun also announced a new midpriced color offering, the SPARCstation IPX, for \$13,495.

Silicon Graphics (SGI) entered the fray with the color-based IRIS Indigo, priced at \$7995, the same price as the NeXTstation Color machine. It offers 3-D graphics and digital audio tape (DAT)-quality sound (SEE WORKSTATION, PAGE 4)

NeXT takes low profile at Siggraph

by DAN GOLDMAN

Las Vegas – The thousands of programmers, engineers, and computer artists here recently for the annual Siggraph conference and exhibition had to look hard to find evidence of NeXT's participation in the high-end computer graphics markets.

NeXT cancelled its booth plans and instead hosted a hospitality suite at a conference hotel.

NeXT computers drew large and enthusiastic crowds in third-party booths on the exhibit floor, however. Brooktree and Philips-Signetics both highlighted NeXT-dimension's video capabilities (each

has chips on the ND board). Wolfram Research showed Mathematica 2.0 running on a NeXTstation Color. Midwest Litho Arts demonstrated the NeXTstation Color as a RenderMan rendering engine for a networked Macintosh running Pixar's Showplace 3D software.

NeXT developers in attendance included Andrew Stone of Stone Design, privately showing a new, more intuitive beta version of Data-File, the flat-file database. NeXT itself showed a number of demonstration programs at the suite, ranging from a [SEE SIGGRAPH, PAGE 4]

NEWS ANALYSIS

Apple/IBM agreement puts NeXT in a quandary

Deal validates NeXT's approach to workstation market

by NICHOLAS BARAN

With the blockbuster technology-sharing agreement between Apple and IBM coming just months after the announcement of the ACE (Advanced Computing Environment) workstation standard, the future landscape of the workstation market is up for grabs, according to industry analysts. The announcements validate the course that NeXT has charted for professional workstations, but they also place NeXT's strategy at risk.

NeXT executives sought to put a positive spin on the developments, pointing out that NeXT already has an object-oriented development environment and a graphical user interface built on top of UNIX. "One of the things we like about the agreement is that it is a real endorsement of our strategy," said Mike Slade, NeXT's executive director of marketing. "They've (Apple and IBM) pre-announced by four years a system that we sell today. It's pretty gratifying."

Indeed, the time frame for the future Apple/IBM operating system is several years out, perhaps as long as five years, said Stewart Alsop, publisher of *P.C. Letter*. Nor is it definite that any product will result from the preliminary agreement. Several analysts compared the announcement to IBM's aborted plans to build systems around NeXTstep.

IBM licensed the NeXTstep environment in 1988 for a reported \$10 million. After initial development on the RS/6000 and the PS/2, IBM abandoned the project. According to Dick Shaeffer, editor of *The Technologic Computer Letter*, "The parties in the Apple/IBM agreement should take note of what happened with NeXTstep. NeXTstep is a first-class technology, and IBM has done nothing with it."

At the least, Alsop observed, the agreement "clarifies and confirms IBM's lack of interest in NeXTstep."

The chips fly

While there are some positive aspects of the deal for NeXT, it raises a critical issue over microprocessor architectures. Future Apple workstations and file servers will be based on IBM's RS/6000 RISC (reduced instruction set computing) processor, not Motorola's 88000 RISC architecture, as had been widely anticipated. That lack of support may leave the 88000 dead in the water. Michael Slater, editor of *Microprocessor Report* newsletter, said the Apple/IBM deal "is not quite, but nearly, catastrophic for the 88000. It's questionable whether it's practical for Motorola to continue to invest in the architecture."

The 88000 has not fared well in the RISC processor arena, losing market share to Sun's SPARC

Apple, IBM to share technology in 4 areas

The preliminary agreement between Apple and IBM is expected to be finalized this fall. Products resulting from this agreement should reach market in two to three years. The agreement listed four "areas of general understanding":

- * Integration of the Macintosh into IBM client/server environments, including joint development of a version of UNIX with a Macintosh interface.
- * Future Mac workstations and file servers based on a single-chip implementation of the IBM RS/6000 RISC processor, which will be manufactured

under license by Motorola.

- * The establishment of hardware-independent software standards for multimedia.
- * Development of an object-oriented operating system based on Apple's advanced "Pink" scalable operating system, now in the research and development stage.



GARY SUEN

and MIPS R3000 architectures. MIPS's successor chip, the R4000, has been selected by the ACE consortium, which includes Compaq, Microsoft, and Silicon Graphics, among others. Motorola's last hope for the 88000 was major support from Apple.

Shaeffer sees the agreement to let Motorola manufacture the RS/6000 for Apple and IBM as "a way for Motorola to save face" after losing support for the 88000; but in fact, said Shaeffer, the deal "shoves the 88000 into the embedded control market."

Giving Motorola the manufacturing rights for the RS/6000 single-chip implementation is a concession from Apple and a way to maintain its good relationship with Motorola. Apple needs Motorola for its current line of 68000-based computers, Shaeffer said.

Meanwhile, the change in Motorola's direction leaves NeXT in a quandary. It had been widely believed that NeXT planned to follow up its 68000-family computers with an 88000-based workstation. But that would leave NeXT as the only computer manufacturer supporting the chip.

"The 88000 is out of the mainstream. NeXT has enough problems; to come out with an 88000 machine would be bullheaded," said Slater. "To go through the pain of switching architectures and then use the 88000 would be a very foolish move."

New direction?

So how will NeXT react to the Apple/IBM alliance? NeXT isn't talking. "All I can tell you is that we have a really good relationship with Motorola," said Slade. "But our primary motivation is price/performance. At the moment, the 68040 is most important for us and has a lot of life left."

However, Shaeffer speculated that NeXT may take a new direction. "Jobs has a knack for headlines," he said. "I think he'll be the first one out with the Intel '586." The Intel chip is the next in line in the 80x86 architecture that has been the mainstay of IBM personal computers and clones. The 80586 is a big step up in power over the '486, however. It uses superscalar RISC technology to produce 100 mips (millions of instructions per second) of performance. Intel has said that the chip will be available in the second half of 1992.

That would be the right time frame for NeXT's next-generation systems. Other chip choices, including the Motorola RS/6000 and MIPS R4000, won't be available soon enough, according to Slater. "The '586 would be a reasonable choice and would give NeXT the ability to run software other than its own," he added.

Whether NeXT now turns to the Intel chip or seeks a different partnership, it is clear that the company has to re-evaluate its existing strategy. NeXT needs to go with a chip architecture that has broad support from other vendors. That's the only way to attract the software developers needed to make the NeXT platform successful.

The good news, analysts agree, is that NeXT has some time. Now that Apple, IBM and ACE have confirmed the wisdom of NeXT's basic approach, NeXT can convincingly argue that it is already delivering technology that the others have only promised. Then it can carefully choose a new chip architecture and still beat its competitors to market with advanced NeXT systems.

NICHOLAS BARAN is formerly West Coast bureau chief for *BYTE* magazine. Baran is a NeXT user and co-director of Pen-Based Computing, The Journal of Stylus Systems in Sandpoint, Idaho.

WriteNow

[CONTINUED FROM PAGE 11]

employee. He said that "substantial" funding for the new venture came from venture capitalists, although he declined to identify the source or amount of funding. NeXT has no equity involvement in the company, Adams said.

The other principals in the company, said to include several industry veterans, were not yet named at press time. The company will sublet office space from NeXT near its headquarters here.

Adams said that the other NeXT software involved in the deal will be announced and shipped in the first quarter of 1992. In addition, the company is looking to acquire or publish software produced by other NeXTstep developers, and it may develop its own software.

"NeXT didn't want to be in the software business, so we had been seeking a third party to pick up WriteNow," said Donna

Simonides, NeXT's director of third-party relationships. "We could have gone to an existing company or encouraged a new one. We wanted someone who would be aggressive," she said.

"By getting out of the software business, NeXT will level the playing field for third parties. It is in the interests of customers to have competition," Adams said.

The chief beneficiary of the move will be WordPerfect Corporation, which faced a barrier in selling its NeXTstep word processor against a program that was free to all NeXT users (see related story, page 1).

"This puts us in a much stronger position," said Royce Bybee, product marketing manager at WordPerfect.

"The first thing [the new company] will have to do is to make WriteNow more of a full-featured word processor," Bybee predicted. "Comparing WordPerfect to WriteNow is like comparing a banana split to vanilla ice cream."

Adams said a price for the shrink-wrapped WriteNow had not yet been established, but that it would be set considerably lower than WordPerfect's \$495. "There is a segment of the market that WordPerfect appeals to and a segment of the market that WriteNow appeals to," Adams said.

Other third-party developers reacted cautiously, unsure of how

closely NeXT would be involved with the new company.

"If NeXT were spinning off a subsidiary that competed in major categories, it would create even less of an incentive for key third parties to support NeXT," said Jeff Anderholm, marketing manager at Lotus Development of Cambridge, Massachusetts.

NeXT's Simonides denied that this was the case. "We have taken deliberate steps not to have a Claris situation. There is a complete separation of church and state. We are treating [the new company] like any other third party," she said.

Adams said that NeXT assisted the company in raising funds only by providing a reference. Raising venture capital "was a tough sell,"

he acknowledged, "but we have a good track record, and the venture capitalists recognized that NeXT is the most fertile ground for software now in the industry because it enables true creativity."

Royal Ferris, vice president of T/Maker of Mountain View, California, which markets WriteNow for the Mac, agreed: "When a hardware vendor aggressively supports [certain] application software, [other] third-party software publishers just shake their heads and think, 'Where's the opportunity for us?'"

"I think this is something that should have happened a long time ago. It surprised us that Steve [Jobs] didn't understand the mistake that Apple had made," by bundling MacWrite with the early Macintosh.

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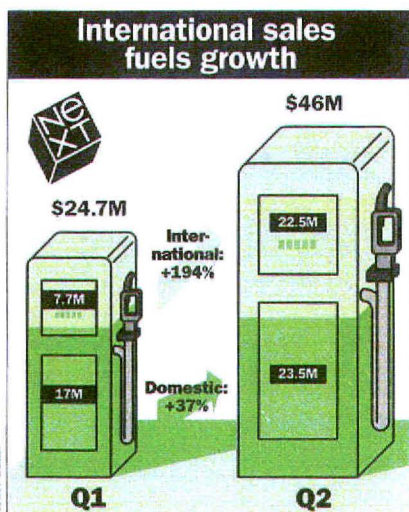
Sales gain in Q2

by SIMSON L. GARFINKEL

Redwood City, CA - Fueled by the availability of color systems and strong international sales, NeXT's revenues grew to \$46 million in the second quarter - an increase of 86 percent over the year's first-quarter sales.

Sales were boosted by shipments of the NeXTstation Color and NeXT-dimension. NeXT also has started shipping a Kanji version of its operating system in Japan, which should further boost sales in that country.

Steve Jobs, president and CEO of NeXT, attributed the sales to NeXTstep, NeXT's object-oriented operating system. "Companies are buying NeXT computers because our object-oriented system software enables them to develop their mission-critical custom applications



many times faster than on any other platform,," said Jobs. "The investments we have made are beginning to pay off."

The investment is paying the biggest dividends overseas. According to NeXT, more than 49 percent of NeXT's total shipments went to customers in Europe and Asia. Seventy percent of NeXT's shipments in those markets went to customers in business and government; the education market consumed the remaining 30 percent.

Jobs said that the increased sales were an indication that computer users want the technology that NeXT is selling - and that major computer companies agreed, as evidenced by the recent technology-sharing agreement between IBM and Apple.

"We view the Apple/IBM announcement as a 100 percent endorsement of the strategy we embarked upon more than five years ago and are delivering today," said Jobs. "Our customers are choosing to get object-oriented system software now, rather than waiting for the rest of the industry to catch up in three to five years."

Even though NeXT is now shipping an advanced, object-oriented operating system, it's still a bit player among giants, said Peter Rogers, an analyst with Robertson, Stephens & Co. of San Francisco. "Those two vendors (IBM and Apple) have somewhere north of one-third of the market share in the worldwide PC business. NeXT has somewhere south of a third of a percentage point. They can afford to take a little longer."

But don't write NeXT off yet, he added: "I wouldn't be surprised if Steve keeps surprising us. It wouldn't be the first time that he's pulled a rabbit out of his hat."

L.A. Sheriff, DARPA on NeXT list

by DARCY DINUCCI

Redwood City, CA - NeXT has made inroads in the government market with the announcement of major sales to the Los Angeles County Sheriff's Department and the Defense Advanced Research Projects Agency (DARPA).

The L.A. County Sheriff's Department has taken delivery of 130 NeXT computers and plans to purchase 200 to 300 more. The Sheriff's office has standardized on the NeXT for its Sheriff's Executive Support System, which will be used to integrate decision

support and information gathering at the department's 100 sites. The new system will automate document management and other key areas with custom applications.

"In our view there was no close second to NeXT to do the kinds of things, right out of the box, that we need the system to do," said Rick Merrick, division chief of the Sheriff's Technical Services Division. The department's system will use software from Boss Logic, Frame Technology, Informix Soft-

ware, and Oracle Corporation.

DARPA is adding NeXT to a research project designed to explore the ideal of the "paperless environment." The DARPA experiment also includes systems from other PC and workstation manufacturers. The inclusion of NeXT systems "demonstrates clearly that our products and technology are being accorded the same serious attention as that of other major computer manufacturers," said Fred Giodano, NeXT regional sales manager.

NeXT shifts sales groups

by DAN RUBY

Redwood City, CA - NeXT's recent shuffle of its U.S. sales management and support organizations does not indicate a shift in strategy, said Erna Arneson, NeXT's new director of channel sales. Rather, the changes, which combined four channel groups into a single organization, eliminated four regional sales offices, and shifted some managers to new jobs in the field, were designed to improve efficiency and effectiveness, she said.

In the reorganization, the old groups that managed dealer sales, VAR sales, and higher education were merged into a single organization headed by Arneson. Two other groups were established to manage sales programs and to target strategic markets. The channel sales and sales program groups report directly to Todd Rulon-

Miller, vice president of sales, while the strategic markets group reports to Mike Slade, executive director of marketing.

"Under this organization, we have better integration of the channels," Arneson said. "Each channel will offer the same programs, giving the company better consistency across the board."

"This also gives us a central focus for communication to the field [sales force], and it provides better synergy between sales and marketing," she said.

The strategy for signing up new dealers and VARs is unchanged, Arneson said. As of July, almost 50 VARs were selling NeXT hardware, and 30 dealer locations were in place. She said the company was on track to make its goals of 100 dealers and 100 VARs by the end of the year.

NeXT Ink

by DAN LAVIN

Bumper crop in the Ukraine

NeXT-watching is like Kremlin-watching in the days before Glasnost. Since it's a private company, NeXT doesn't have to say anything about its finances. However, like the Kremlin, NeXT cannot be completely isolationist and also be a player on the world stage. So NeXT has begun the curious end-of-quarter ritual: it doesn't release all its numbers, just selected ones, leaving the rest of us to interpolate the whole picture from a few snippets. It's like May Day in Red Square, except Steve is still alive so there's no tomb for the executives to stand on.

NeXT released figures for the second quarter, that, on the surface, look excellent. They show a run rate commensurate with a \$200 million dollar company and an 86 percent sales growth from the previous quarter. A closer look at the figures tell a slightly different story, however.

NeXT had a \$46 million second quarter. The disclosed sales increase shows it did about \$25 million in the first quarter. We were told that 8000 CPUs shipped in the first quarter. Given an average receipt to NeXT of about \$5000 per machine (based on a reasonable estimate of NeXT's margins and the mix of machines sold), this is only 4400 new computers and about 3600 upgrade boards. Of these 4400 real computers, only about 3100 stayed in the United States. The rest went overseas. NeXT attributes some of this weakness to customers waiting for color machines. I'll give them that one.

The lesson here is that NeXT did not have a great first quarter, especially in the United States. If annualized, these first-quarter numbers showed a \$100 million company with 20,000 units sold. Both these numbers are half what some analysts have said NeXT needs to maintain momentum.

Now on to the second quarter, the mother of all quarters. Yes, there was an impressive increase to a level that can sustain NeXT. But the important numbers are the units and the domestic/international breakdown. Assuming an average selling price of \$6500 per system (higher this time because of color availability), sales were 7100 units. Only half stayed in the United States this time - 3550 units. This represents a 14 percent increase in units over a poor quarter, 37 percent by dollars.

Internationally, units almost tripled, while dollars more than tripled. These are great results. That's without the effect of having a Kanji operating system, since it began shipping in earnest only at the end of the second quarter.

So the question arises: What are they doing right over there? Or, what are they doing wrong over here? I'll suggest some possible solutions in a future column.

The danger in all of this is not that NeXT won't survive, but that the United States will be little more than a nuisance market. I predict at least a 60 percent share for international in the third quarter.

The domestic sales and marketing people are on the hot seat to make sure it doesn't hit 70 percent. We should know by NeXT May Day. If the news is good, NeXT will report units and dollars, domestic and international. If the news is bad, look for total transistors shipped. Or else a prediction of a bumper wheat crop in the Ukraine.

BRIEFS
Continued

lines using ISDN, which is now being introduced by regional Bell operating companies throughout the country. Phone 404/840-9200.

Pixar, Steve Jobs's other brainchild, has signed on with Walt Disney Pictures to produce and distribute one or more full-length, computer-animated feature films. Pixar is best known for shorts like *Knickknack* and *Tin Toy*, which garnered the first Academy Award ever bestowed on an entirely computer-generated film. Given the normal production cycle in the movie industry, look for the first of the new offerings sometime in 1993.

Objective Technologies expects a fall ship date for OTProvide, the first third-party add-on to Lotus Development Corporation's Improv spreadsheet that utilizes Improv's Application Programming Interface Toolkit. OTProvide is an SQL generator and database link, browser, and retriever. It allows the end user to introduce data and information from Sybase databases into Improv spreadsheets through a point-and-click subsystem that searches databases and servers and mimics the NeXT File Viewer. Future releases will support any database that is supported by NeXT's upcoming DBKit, according to Sheridan Harrison, product manager.

Absoft has updated its FORTRAN 77 compiler for the NeXT to version 3.1 to be fully compatible with NeXT's 68040 machines. The company claims that the compiler produces code that executes up to two times faster than any other FORTRAN available for the NeXT.

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Editorial Director: Dan Ruby;
Manager: Darcy DiNucci; News Editor:
Dan Lavin; Staff Writer: Simson L.
Garfinkel; Copy and Layout Chief:
Sue Troy

WordPerfect [CONTINUED FROM PAGE 1]

The company recently scaled back its NeXT development staff from eight programmers to four, according to Tom Mallory, vice president of development. "It's dollars and cents. As the platform can support more programmers, we'll go ahead and put more programmers on it," he said.

Although a new major release of WordPerfect for the NeXT won't happen in the near future, the company plans several "interim releases," said Powell. First on the agenda is support for French and German. Another release will enable exporting of Microsoft Rich Text Format (RTF) files.

Siggraph [CONTINUED FROM PAGE 1]

possible Icon successor to a multimedia animation and authoring tool. There was no announced shipping date for this software.

Popular attractions on the exhibit floor included NewTek's Video Toaster and new 3-D design software from a number of companies, notably Alias. The scene stealer was Silicon Graphics's new IRIS Indigo computer (see related story, page 1), boasting a smart

The next major release of WordPerfect for the NeXT will include many features now available only in WordPerfect 5.1. "We are going to have equation editing," said Powell, as well as the capability to undelete and create user-programmable macros. The next release may also include the capability to insert voice comments with NeXT's Lip Service.

Powell also raised the prospect of developing a new version of DrawPerfect for the NeXT platform. "We feel that we can make it the best draw package on any platform—but let's make some money before we start spending more," he said.

industrial design and SGI's suite of graphics software.

Other signs of NeXT could be found in software such as Hewlett-Packard's Interface Architect, a more limited and less elegant Interface Builder-like tool based on Motif.

Conference attendees were baffled by NeXT's pullout. "It has one of the best development environments," said one software engineer. "With that and its video, it could have blown people away."

Executor [CONTINUED FROM PAGE 1]

NeXTWORLD tested the pre-beta software successfully with several Macintosh applications, including Microsoft Excel and some public-domain programs. Although loading Mac software on the NeXT machine required running a series of installation programs from the UNIX command

Workstation [CONTINUED FROM PAGE 1]

but is diskless and has no video-to-disk or compression capabilities.

"Anybody who delivers lots of price/performance at a midpriced level is inevitably a competitor of ours," said Mike Slade, NeXT's director of marketing.

But the battle for professional users does not center only on price and performance, according to Lisa Thorell, a workstation-industry analyst with Dataquest of San Jose, California. "Sun is simplistic; it reacts to large market shares." The path of least resistance for them is to appeal to sophisticated PC users who want more power and strong software support, she said.

line, Matthews said that installation will be automated in the shipping version.

Matthews claimed that the shipping version of Executor will run software at Macintosh II speeds on a 68040 NeXT. ARDI expects to price Executor at about \$700. Limited versions to run only one program, such as Excel, may be marketed for less than \$100.

But that's not true interpersonal computing, allowing all workers in a group to contribute equally, according to Curtis Sasaki, NeXT's manager of hardware marketing. "For Sun to sustain its growth, it decided to get into the professional workstation market. But you also have to have a great software base."

The IRIS Indigo machine challenges NeXT's attempt to take a share of the multimedia market, said Dataquest's Thorell. "SGI has lots of resources and has attracted lots of software. It is the Porsche of the workstation community. NeXT has to refine and narrow its marketing strategy to compete directly."

Now, even Sullivan is plunging into color

Lt. Sullivan looked at his watch and muttered to himself about the receptionist, who was late for the third time this week. He hates to answer the department phones, although he always seems to get some interesting calls to put through when he does.

Lt. Sullivan looked at his watch as his stomach rumbled yet another time since he'd eaten the day-old pizza in the cafeteria. It crossed his mind that with the budget there they could afford decent food for the staff. "Time to get back to work," he thought as he turned back toward his computer screen. He figured he had about another hour before the boss would return from lunch and he would have to have something done.

Sullivan pulled out his notes to review the week's activity for his regular briefing to his boss.

Just when color laser printers are beginning to drop in price and become more common, NeXT is poised to release a very nice new printer product. The new color laser printer from NeXT, at 400 dpi, will again beat the 300-dpi limit of most of the competition. Also like the black-and-white NeXT laser printer, the NeXT color laser printer uses the NeXT computer to raster the image, which is then printed by a thermal dot transfer process engine. This printer is expected to debut for a list price less than \$5000.

Is something going on in Redmond? If not, how come Steve has been spied in private chitchats with Chairman Bill on more than one recent occasion? We have already seen how new industry alliances can create strange bedfellows.

Speaking of which, most of the field operatives are expecting dire results from the blue and red alliance. The one thing on NeXT's side is that these guys are not going to get along. It should take their engineering staffs six months to figure out how to talk to each other; and then they need to agree on a language. I think the premarital agreement will collapse long before the two Johns arrive at the chapel.

I half expected Ron Howard to come running into the room and shout "Cut!" as I had my first experience with a rogue DGS3 board that a field agent managed to get her hands on for me. I was shocked when the agent opened the box, only because I had never seen a computer product ship with three external fans! This baby is one step shy of being a nuclear toaster, but I always wanted a combination workstation and tanning booth.

Originally known as the Daewoo Graphics Imaging System, this board was to be manufactured by Daewoo and marketed and distributed by Leading Edge. After two years of inactivity, the designers at the University of Washington granted a U.S. company nonexclusive rights to manufacture and distribute a version of the board worldwide. Cube Technologies' new version of the board will allow unmodified NeXT software to take advantage of up to 160 mfpms. It is fast—incredibly fast.

With a little ice and a beta copy of Photoshop NeXT, this could really ring the bells in the cathedrals of Cupertino and cause some sleepless nights down at Silicon Graphics.

Adamation has quietly dropped all immediate plans to develop a much-ballyhoosed accounting package. Bottom Line was to be developed for the business market as the NeXT answer to this traditional DOS stronghold (and Macintosh weak area). How can one platform have the best spreadsheet and the worst accounting software (more at all)?

They are still having trouble with order management at NeXT, despite the numbers of units shipped so far. You would think they would have it down by now.

Unfortunately, orders are still written down incorrectly, and the term "it's on the shipping dock" seems to mean "you're about four weeks away from your actual factory ship date."

When it does ship, check your system carefully. More than one customer recently received mixed parity and nonparity memory chips.

Lt. Sullivan marveled at the consistency of the locations noted in his field agents' reports. Apparently, the best place to overhear everything you were never supposed to hear about the NeXT computer is the front lobby at 900 Chesapeake, Redwood City, California. You grab yourself a cup of coffee and sit in the big, uncomfortable black leather sofas, pretend you are reading the Wall Street Journal, and listen to the people chatting as they pass by. It is a terrible shame about the cancellation of the Odwalla juice concession, though.

I've still got some Steve-signed Sullivan shirts to pass along to tipsters. You can e-mail me at: Sullivan@nextworld.com or call my voice mail at 415/978-3189. Don't call at the Agency, though. If you do, you lose the shirt.

NEWS
IN BRIEF

Computer Support Corporation unveiled a version of its popular Arts and Letters Graphics Composer for the NeXT platform. The program includes more than 5000 pieces of clip art and dozens of typefaces that users mix and match to create illustrations, diagrams, signs, and presentation aids. The program will ship in the fall of 1991. The company can be reached at 214/661-8960.

Stone Design shipped Create!, a professional color drawing application for the NeXT. It is used to create complex PostScript graphics and text. Create! was reviewed in beta by NeXTWORLD in the January/February 1991 issue and received 4 cubes as a beta rating. Create! costs \$500. Stone Design: 505/345-5800.

Pantone colors will be available in future versions of the NeXT operating system, NeXT announced. Both the Pantone Matching System and the Pantone Process Color System will be included. The colors will all be available through the color list option in the Colors panel that spans all NeXT color applications.

NeXT CEO Steve Jobs became a father for the second time when his wife Laurene gave birth to Reed Paul Jobs on Sunday, September 23. "Laurene and I are wonderfully happy," he wrote in an e-mail message to employees.

Information Presentation Technologies (IPT) announced uSHARE 2.05 for the NeXT. The software allows a NeXT workstation to serve as an AppleShare file, print, and e-mail server. While operating as a server, the NeXT can still be used as a fully functional workstation. An optional bidirectional [SEE BRIEFS, PAGE 5]

NeXTWORLD Expo
coming in
January

See Page 3 for details

Graphics apps take off

San Jose — NeXT's potential as a publishing platform received a boost last month as third-party developers announced new programs for page layout, presentation, illustration, and scanning at the Seybold Computer Publishing Conference.

Concurrence: New presentation outliner from Lighthouse Design

by DAN RUBY

Building on the success of its business graphics package, Diagram!, Lighthouse Design introduced Concurrence, an integrated outliner and presentation program.

Concurrence follows the model of Macintosh presentation programs such as Aldus Persuasion and Symantec's MORE by combining an outline program with graphics tools to produce a series of slides that can be output to a variety of devices.

With the inherent advantages of NeXTstep, however, building professional-quality presentations with Concurrence is much easier than with other tools, according to Jonathan Schwartz, manager of sales and marketing for Lighthouse Design.

"Our goal was to make a tool that would enable people to build a presentation in less than an hour," Schwartz said.

To begin a presentation, users construct an outline with multiple levels of headlines that can be moved, cloned, and displayed in collapsed or expanded formats.

Text formatting of any headline is automatically reflected in other headlines of the same hierarchy.

Unlike other outline programs, sections of the [SEE LIGHTHOUSE, PAGE 5]

PasteUp: Right-Brain targets page-layout gap

by DARCY DINUCCI

Promising to fill the void for NeXT page-layout applications, Right Brain Software last month demonstrated a pre-alpha version of PasteUp.

Although the version of PasteUp shown had very few features complete, its basic approach, emphasizing point-and-drag interaction with on-screen objects, was evident. For example, Right Brain founder Glenn Reid demonstrated the program's ability to move graphics from page to page by simply dragging them in [SEE RIGHTBRAIN, PAGE 5]

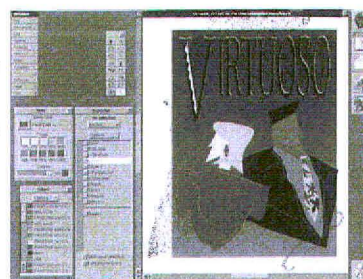
Virtuoso: Illustrator challenger

by DARCY DINUCCI

Altsys Corporation, developer of Aldus's FreeHand for the Mac, took its battle with Adobe Systems for the illustration market into a new arena last month when it announced Virtuoso for the NeXT.

Like FreeHand, Virtuoso features multiple "layers" for adding and subtracting graphic effects

from a document. Altsys claims that Virtuoso will be able to handle an unlimited number of layers and an unlimited number of levels of undo/redo. Advantages over the Mac product include the ability to view PostScript effects on screen, thanks to the NeXT's Display PostScript interface, and the ability to edit text within the graphic display instead of in a special text window.



Unlike FreeHand on the Mac, Altsys's Virtuoso illustration program shows PostScript fills on-screen.

The company said that the program would be priced at \$695 and would ship in the first quarter of 1992.

Comparing Virtuoso to Adobe's Illustrator for the NeXT, Altsys product manager Kevin Crowder said, "We think we're more like a native NeXT application than a port from the Mac, and we have a tremendous [SEE VIRTUOSO, PAGE 6]

NeXTstep 3.0 on the horizon

by SIMSON L. GARFINKEL

Redwood City, CA — NeXT is on target for a mid-1992 release of NeXTstep 3.0, which will provide major new communications, database, and programming functions without significantly modifying the current system, according to developers familiar with the project.

In addition to the previously disclosed client support for Novell and AppleTalk networks, and a new database development system, sources said that the new system may include:

- full support for high-density Macintosh floppy disks
- a higher degree of control over the NeXT's floppy disk and communications ports
- support for PostScript Level 2, including Pantone color matching
- a sound server, which will automatically mix sounds played by multiple applications at the same time
- synchronized sound and video
- 3-D PostScript extensions
- support for screens with different pixel configuration than the standard NeXT MegaPixel Display. [SEE NEXTSTEP 3.0, PAGE 5]

Appsoft ships WriteNow, announces Pixelist

by DAN RUBY

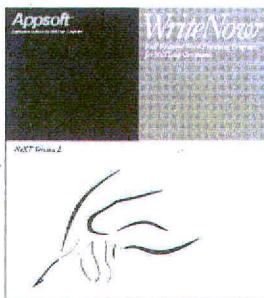
Palo Alto, CA — Appsoft kicked off ambitious plans to become the premier publisher of NeXT software last month by shipping a shrinkwrapped version of WriteNow and announcing plans to publish Pixelist, a photo-editing program.

After completing a complex negotiation to acquire rights to WriteNow from NeXT and closing a venture-capital deal with The LEK Partnership in September, Appsoft

began selling its packaged version of the formerly bundled word processor on October 15. Priced at \$199, the program comes with a disk of three Adobe fonts and an sampler of EPS images from T-Maker Co.

According to Appsoft President Randy Adams, an upgrade to WriteNow is under development for release in the second quarter of 1992. The new [SEE APPSOFT, PAGE 5]

WriteNow is now shrinkwrapped by Appsoft.



NEWS ANALYSIS

Apple aims '040 Quadras at NeXT market territory

Appealing price, performance, and features – for a Mac

by BRUCE F. WEBSTER

With the introduction of its 68040-based Macintosh Quadra on October 21, Apple has taken its first step into NeXT's market niche for professional workstations. But while the new system will provide a performance boost for Mac users, its comparative features and pricing do not measure up to NeXT's current products.

For all its advantages, the Macintosh lived most of its product life under the stigma that it was underpowered and overpriced. Then, just as the Mac was gaining respect vis-à-vis PCs, low-cost workstations from Sun and NeXT once again made Macintosh price/performance look bad – especially since Apple's best-selling system, the Mac Classic, has roughly the same computing power as the original Macintosh system introduced back in 1984.

With the Quadra series, Apple is seeking to regain its position. The first two Quadra models are the Quadra 700 desktop system, built roughly like a Mac IIci, and the Quadra 900 tower. Both have the same basic hardware configuration: a 25MHz 68040 CPU, on-board Ethernet and color video, improved sound functionality, and other performance enhancements. All of this is offered at what are – for Apple, at least – quite competitive prices.

With the Mac Quadras, Apple now has a legitimate entry into the workstation market. Given the broad acceptance of the Macintosh and the vast body of Mac applications, this should give Sun, HP, DEC, and NeXT a bit more to worry about. On the other hand, Apple's new products may actually give NeXT a boost: Apple's system uses the same processor as the NeXTstation, but at a substantially higher cost. The table here compares some equivalent (or near-equivalent) Quadra and NeXT configurations. As you can see, once you start putting together complete systems, the prices for the Quadra systems start going up significantly. The table prices assume third-party memory and storage devices.

Second effort

The Macintosh IIx was supposed to lead Apple into the workstation market when it was introduced a year and a half ago, but three major problems caused the attempt to fall short. First, the performance boost of the IIx – about double the speed of the Mac IIci – was significant, but it wasn't enough to catch the market's attention. Then, the machine's non-standard architecture – with latched RAM requiring custom SIMMs, direct memory access for the SCSI port that never worked, and a couple of I/O processors that didn't do much – stymied developers. Third, the price – \$10,000 to \$12,000 at introduction for a base system with no monitor, video card, or keyboard – was out of range. The Mac IIx made even the original \$10,000 NeXTcube look like a great deal.

PERSONAL COLOR SYSTEM				
	Color NeXTstation		Quadra 700	
		Price	Price	
CPU	25 MHz 68040	\$6650	25 MHz 68040	\$6999
Memory	12 MB RAM		12 MB RAM	\$240
Storage	200 MB hard drive, 2.88 MB floppy drive		160 MB hard drive, 1.44 MB floppy drive	
Sound	25 MHz 56001 DSP, microphone jack, DSP port, headphone jack, dual line-outs		Apple sound chip, microphone jack, hand-held microphone, headphone jack	
	NeXT Sound Box (video, audio, microphone)	\$125		
Networking	Built-in twisted-pair, thin Ethernet (AppleTalk to come in NeXTstep 3.0)		Built-in Ethernet, AppleTalk Thin-wire transceiver	\$175
Input	NeXT keyboard, two-button mouse (in Starting Kit)	\$225	One-button mouse Apple keyboard	\$129
Video	Color; 1120 x 832, 16 bits/pixel		Color; 1152 x 870, 8 bits/pixel	
Display	17" Color Megapixel Display; color, 1120 x 832, 16 bits/pixel	\$1995	Apple 13" RGB Display; color, 640 x 480, 24 bits/pixel	\$999
			Extra 1.5 MB VRAM	\$597
Total		\$8995		\$9139

This time, Apple appears to be a bit closer to the mark. According to Apple, a Quadra system is roughly four times faster than a Mac IIci, and double the speed of a IIx. This means that it should be comparable to NeXTstation performance in many areas and superior in some. There are no fancy tricks in the design, but tweaks have been made in all the right places. You can even use regular 80-nanosecond DRAM SIMMs. And list prices start at \$5699 for a bare bones Quadra 700 (4MB RAM, floppy drive) and \$7199 for a similar Quadra 900 tower.

The Quadra's performance increase comes from several factors:

- a 25MHz 68040 CPU
- division of the internal architecture into two buses, a 25MHz system bus and a 16MHz I/O bus
- a faster SCSI controller chip, located on the system bus rather than the slower I/O bus

- significant improvements in NuBus performance, including placing the NuBus controller on the system bus and support of pending writes, block transfers between main memory and NuBus cards, and double-speed burst transfers between NuBus cards
- separate VRAM for the on-board video.

What is most significant about this architecture is its cleanliness and simplicity. Almost every Mac since the IIci has had some tricky architecture, and in almost every case, that has come back to haunt Apple, usually through performance or compatibility problems.

Feature for feature

The Quadra series's hardware integration is another step forward for the Macintosh, but still doesn't measure up to NeXT's. The built-in color video uses VRAM banks expandable to 2MB, enabling the Quadra systems to support 24-bit color on 13-inch monitors and 8-bit color on Apple's newest 21-inch monitor. Apple claims drawing performance is 80 percent of its 8•24/GS accelerated graphics card, due to direct access by the CPU to the VRAM, which is

FILE SERVER				
	NeXTcube		Quadra 900	
		Price		Price
CPU	25 MHz 68040	\$6775	25 MHz 68040	\$8499
Memory	16 MB RAM	\$250	16 MB RAM	\$375
Storage	105 MB internal hard drive 2.88 MB floppy drive, 1.2 GB external hard drive	\$2200	160 MB internal hard drive, 1.44 MB floppy drive 1.2 GB external hard drive	\$2200
Sound	25 MHz 56001 DSP microphone jack, DSP port, headphone jack, dual line-outs		Apple sound chip, microphone jack, hand-held microphone, headphone jack	
Networking	Built-in twisted pair, thin Ethernet (AppleTalk in NeXTstep 3.0)		Built-in Ethernet, AppleTalk Thin-wire transceiver	\$175
Input	NeXT keyboard, two-button mouse (in Starting Kit)	\$225	One-button mouse Apple keyboard	\$129
Video	Mono; 1120 x 832, 4 bits/pixel		Color; 1152 x 870, 8 bits/pixel	
Display	17" Megapixel Display, mono; 1120 x 832, 4 bits/pixel	\$995	15" Apple Portrait Display, mono; 640 x 870, 8 bits/pixel	\$1099
Total		\$10,445		\$12,477

connected to the system bus. This gives the Quadra series graphics performance that is probably better than the NeXTstation Color, but not up to NeXTdimension standards.

The Quadra series also comes with built-in Ethernet – sort of. The basic hardware is on the motherboard, but you still need to buy a transceiver – an Ethernet adapter, if you will – to connect Apple's 15-pin output to any standard Ethernet cabling (twisted-pair, thin, or thick).

The Quadra 700 can hold two 3.5-inch, one-third-height mass storage devices, typically a floppy drive and a hard disk. The Quadra 900 has lots of internal room; it will accommodate four 5.25-inch, half-height devices, two of which can have removable media (floppy drive, optical drive, CD-ROM). It's obvious which one is intended to be a network server.

Sound on the Quadra series has been enhanced a bit, though it falls short of the NeXT's built-in digital signal processor. It's based on an Apple sound chip, which can produce stereo output, but don't let the dual line-ins on the Quadra 900 fool you: the sound system can only digitize in monaural. The Quadra 900 has a nice touch, though: an internal connector allowing you to run stereo sound directly from a CD-ROM player to the stereo headphone output.

The area in which the Mac continues to best the NeXT is expandability. The NeXTstation has no slots for add-on boards, and the NeXTcube's slots have such a large (11-inch x 11-inch) form factor that few firms are designing cards for them. The Quadra 700 has two NuBus slots and a single processor direct slot, or PDS (although if you use the PDS, you can't use one of the NuBus slots, due to overlapping alignment). The Quadra 900 has five NuBus slots and an overlapping PDS.

Winners and losers

As is often the case when Apple introduces new machines, its biggest competitor will be itself. While Apple would make no comments on future pricing plans for either the Macintosh IIci or IIx, it stands to reason that these systems will either be phased out or reduced in price. Dropping the price on the Mac IIci could put additional price pressure on the Mac IIci, which is overpriced and underpowered anyway.

Even with all the things Apple did right, the Quadra series falls short of being a breakthrough; it's a step up, but not a quantum leap in architecture, function, or price/performance. With all that, however, Apple will probably sell a lot of Quadras – especially the Quadra 700 and the upgrade board. And all of its workstation competitors are vulnerable: Sun, HP and DEC because of their weak interfaces and expensive software; NeXT, because of its ongoing fight to gain credibility and market share.

By shipping a system with the same processor as the NeXTstation, Apple validates the processor while underscoring the relatively low cost of equivalent NeXT systems. At the same time, Apple's partial movement into architecture that is standard on the NeXT emphasizes the importance of those features without challenging NeXT's leadership in them. Maybe Apple is saving its best stuff for the next generation of Apple computers, RISC-based systems running the "Pink" operating system. As Philippe Kahn, president and CEO of Borland International, a Scotts Valley, California, software company, reportedly said, the Macintosh III already exists: you just have to go to Redwood City to get one.

BRUCE F. WEBSTER is a contributing editor to NEXTWORLD.

NeXTWORLD Expo set for January in SF

by DAN LAVIN

San Francisco — NeXTWORLD magazine announced plans for the first-ever gathering of the entire NeXT community at NeXTWORLD Expo '92. The event is set for the Civic Auditorium in San Francisco, from January 22 to 24.

"The whole NeXT phenomenon is in the process of exploding, while at the same time there is still the feeling of a tight-knit family," said Jeannine Barnard, associate publisher of NeXTWORLD. "There has never been a formal gathering of this community before, and we're thrilled to host this celebration and provide an opportunity for the world to see all facets of the NeXT in one place at one time," she said.

The Expo will have a comprehensive program of activities for NeXT users and developers, including these events:

- a trade show, featuring hardware and software products available for the NeXT platform
- keynote addresses from leaders of the industry, including

NeXT CEO Steve Jobs

- a user conference track organized by the editorial staff of NeXTWORLD magazine
- a NeXT Developer Conference organized by NeXT's Developer Group
- a meeting of the International User Group, bringing together members from the over 200 NeXT user groups around the world.

The product exhibition and user conference will run for two days, with the developer conference following on the third day. Further details will be announced soon in NeXTWORLD.

Expo at a glance

What NeXTWORLD Expo

When January 22-24, 1992

Where San Francisco
Civic Auditorium

Registration information
To come in NeXTWORLD

European Expo shows French products

by JAMES FELICI

Paris — The first European NeXT exposition, a three-day show called "NeXT is Now," held at the Centre National des Industries et Techniques here in September, drew a strong turnout of locally developed applications. NeXT attendees, however, were vastly outnumbered by visitors to AppleExpo, which ran concurrently in the same building.

Among the homegrown products from French developers:

A trio of NeXTstep applications from Teledia S.A., a Lille-based company founded by three former Carnegie-Mellon students. Phrase-Player works as a dictaphone for LipService memos. Using pauses in the sound file as clues to structure, the program can back up and repeat a sentence or jump ahead a sentence at a time. The typist can also stop and start the voice memo at any time by giving a voice command.

The second program, FileMaster, is a simple flat-file database suitable for list management and scheduling. Each cell can have a unique set of attributes and a different structure. A forthcoming report generator will enable users to superimpose a data report

on any TIFF, PostScript, or fax image, as well as other formats.

The company also showed BackupMaster, a hard disk backup program of a type familiar to PC or Mac users.

The Ariel music synthesis system for real-time signal processing, developed by researchers at the Institut de Recherche et Coordination Acoustique/Musique (IRCAM) in Paris. The Ariel board piggybacks on a NeXT-cube, using its host for graphic interface and file storage. The computing is done on the Ariel board, which sports two Intel i860 processors and a 56000 I/O chip. The board's designer, American Eric Lindemann, claims processing speed "maybe a quarter as fast as a Cray."

Ariel's MAX software is a graphical sound programming language developed at IRCAM that is used to create and edit sounds. Another program, ANIMAL, enables the user to create interfaces to control sounds and the relationships between them.

Priced at \$14,995 in a single-board configuration, the product will probably be used in recording studios. The Ariel system is marketed in the U.S. by Ariel Corporation of Highland Park, New Jersey. Cub'X-Window, from Cub'X



An employee of NeXT Europe demonstrates software at NeXT is Now.

Systems, enables a NeXT machine to run on a Sun workstation network as an equal partner. Running Cub'X-Window without starting NeXTstep makes the NeXT look and act just like a Sun workstation, with performance equivalent to a SPARCstation 1+.

Other booths featured custom Sybase applications, imported software (WordPerfect, Sybase, Improv, and Illustrator), bundled systems built by local NeXT Centers, and basic NeXT technologies (sound management, multimedia, color graphics, and voice mail). The busiest booth was the one demonstrating Interface Builder.

Users unite at D.C. Super Seminar

by STUART SILVERSTONE

McLean, VA — A community that had only existed in the tenuous realm of telephone and e-mail was brought to life at the Super Seminar here on September 28 and 29. The Washington NeXT User Group (WanUG) event drew 300 attendees from 35 user groups, many states, and several foreign countries. Thirty vendors took the opportunity to show off their wares.

"It was an opportunity for those who had only known each other by e-mail to see faces and shake hands," said Conrad Geiger, international NeXT user group manager.

Attendees at the weekend meeting, held at a Mitre Corporation facility here, launched two new international groups, one for users and another for product developers. User applications were a strong theme of the conference, especially those advances on the leading edge of science, sound, and visualization.

The influence of the federal government was never farther from the conference than the sign (unused at this event) in the front of the room that could be lit

unclassified, confidential, secret, or top secret as needed. Vendors voiced pleasure with the purchasing responsibility of attendees and especially the timing of the conference at the end of the government's fiscal year, when federal users are eager to spend remaining budgeted funds.

"This is a good market, because the government buys a copy for every machine [for which they need it]," said Andrew Stone, president of Stone Design, a NeXT software developer from Albuquerque, New Mexico. "Also, this show disposed of the myth that there's not much software for the NeXT."

In the keynote address, Los Alamos National Laboratory researcher and MediaView software developer Richard Phillips challenged users to make their multimedia requirements known and not passively allow vendors to define the industry. He also demonstrated MediaView's ability, following the capabilities of word processing programs, to easily integrate interactive scientific visualizations into a document.

On another panel, Henning Lei-

decker, an engineer at the NASA Goddard Space Flight Center, described how the platform aids the analysis of data used in the launch and support of the Geostationary Operational Environmental Satellite (GOES) — the results of which are seen daily on most local television weather newscasts.

Software multiplies scanner options

by DARCY DINUCCI

San Jose — Second Glance last month announced a universal scanner application designed to provide drivers that allow almost any scanner to be controlled by a NeXT workstation. Called ScanTastic, the Second Glance product is accessible through the NeXT Services menu, which is included in any well-behaved NeXT 2.0 application.

Although any scanner with the requisite interface (the NeXT supports SCSI, and with adapters, GPIB, or general purpose interface bus) can theoretically be connected to a NeXT machine, NeXT-specific software is required to control the hardware from the workstation.

ScanTastic provides a scanner control interface that can be used with multiple brands of scanners. Second Glance currently offers drivers for the Epson ES-300C (GT6000) and the Nikon LS-3510 slide scanner. Other drivers are slated for release in the near future.

ScanTastic also includes color-correction features such as brightness, contrast, saturation, and tone curves. The program's editing features are provided in a script-like interface that allows users to apply image-editing commands to the image without changing the underlying file until

the image is saved. The program will also accept external modules for additional capabilities.

The program will ship this month at a price of \$595 for the Epson version and \$995 for the Nikon version. Additional drivers after the first will be offered at substantial discounts.

ScanTastic is the first NeXT product from Second Glance, which has created a custom version of ScanTastic and other graphics programs for the Macintosh. Second Glance is located at 25381-G Alicia Pkwy. #357, Laguna Hills, CA 92653. 714/855-2331; fax 714/586-0930.

Analysts split on Apple/IBM

by DAN LAVIN

San Francisco — The announcement last month of a joint venture between Apple and IBM to develop an object-oriented operating system for future workstations appears to erase any possibility that IBM will release a product based on its earlier license of NeXT's system software, according to analysts.

NeXT claimed that the formation of Taligent validated its own technology and approach to the market. "In four to five years, they may have something as good as NeXT has today," said NeXT CEO Steve Jobs.

The Taligent offering is not expected to be ready until 1995 or later, but IBM and Apple also announced a short-term solution based on a RISC chip called PowerPC that is coupled with a PowerOpen operating system comprising OS/1AIX UNIX and the Macintosh user interface.

Some observers viewed the PowerOpen announcement as a threat to NeXT in the near future. They "are in big trouble," according to David Card, Director of Systems Research for International Data Corporation, an industry research firm.

Other analysts noted, however, that computer industry alliances sometimes fail to bear fruit. The conflicting corporate cultures and business goals of the two industry giants leave some doubt as to their ability to produce joint products.

"It is easier to make alliances than innovative products," Jobs said.

The PowerOpen and Taligent initiatives appear to directly overlap with NeXT's strategy. Indeed, IBM vice president Jim Cannavino and Apple CEO John Sculley used phrases such as "personal workstation," "custom applications," "object-ori-

[SEE APPLE/IBM, PAGE 6]

HSD takes over Abaton fax modem

by DAN LAVIN

Mountain View, CA — HSD Microcomputer U.S. continued its expansion in the NeXT marketplace last month with the acquisition of Abaton's InterFax 24/96. The Mountain View-based company will repackage Abaton's existing inventory and OEM future product directly from Abaton's parent company, Everex, as part of a long-term relationship.

"The main reason [for the deal] is that with NeXT changing their platforms we'd have to invest considerable resources to update our product," said Mark Marlow, director of mar-

[SEE HSD, PAGE 6]

NeXT hones focus on custom development

Ads, seminars to promote development tools over productivity

by DAN RUBY

Redwood City, CA — After a thorough review of its marketing strategy, NeXT has begun rolling out a major new campaign of advertisements and seminars focusing on the advantages of NeXT computers for custom application development.

"We have spent six months listening to our customers to better learn who they are and, just as important, who they are not," said Ronald Weissman, director of strategic marketing. "What we have found is that our strength is in custom development of mission-critical applications, where new technology makes the difference in functionality, time to market, and maintainability."

"We have to focus on what we do uniquely well versus what we do somewhat better. For now, custom development is our most compelling sale," he said.

"What they are saying is that they want to compete against Sun and not against the Macintosh," said Andrew Stone, president of Stone Design, author of Create! and Dataphile. "I'd rather see them spending tons of marketing bucks to target Joe user."

Weissman said that the new focus goes hand in hand with earlier marketing approaches focused on interpersonal computing, publishing, and general productivity. "This is a matter of broadening our strategy, not throwing anything away. Typically, after customers have developed their apps, they use it for many other purposes."

He described the typical application for custom development as containing several key attributes, including a back-end database, multimedia data types, and networked workstations. Many of NeXT's key installations, including Wall Street firms, medical institutions, the William Morris talent agency, the L.A. County Sheriff's department, and the Alain Pinel real-estate firm, fit this description, he said.

"These companies live and die by the speed at which they can get a custom app to market. With mission-critical applications, it is a question of whether it makes money for you," Weissman said.

Weissman also said that today most companies buy dedicated machines — usually workstations — for custom development and personal computers for general productivity. NeXT will position its computers as fulfilling both requirements in one machine.

Weissman would not say how much money NeXT has earmarked for the campaign, but called it "a significant investment over the course of the next year." He said that the market for custom programming services for Fortune 500 companies and federal agencies was more than \$1 billion last year. ♦

NeXT on MTV: The commercial

The NeXT computer was the star of a recently produced television commercial for TDK audio tapes, to be aired nationally on network television and MTV.

The commercial, which shows a writer working on an article for Audio magazine, was originally to have

featured a typewriter, but the commercial's producers, Partners USA, and ad agency, Lord, Dentsu & Partners, decided that that wouldn't be in keeping with TDK's high-tech image. Partners' research team, headed by Greg Ramsey, was swayed by a NeXT brochure that not only covered the machine's features but showed how well it photographed.

Although the NeXT was chosen, like many television personalities, for its good looks, the producers soon discovered that this star had some soul. In the spot, MediaStation was used to add special effects from video sequences, and the writer can be seen using WriteNow. Ramsey cited Display PostScript's type-scaling features as an important benefit in a commercial in which typing plays an important role. — Lee Sherman



Canon USA becomes VAR

by DAN LAVIN

San Jose — Canon USA's extensive copier dealer network has begun selling NeXT machines bundled with Canon Color Laser Copier products. A value-added-reseller agreement with NeXT puts Canon in a "position to create complete color solutions," said Hideharu Takemoto, CEO of Canon USA.

When attached to a NeXT computer with controller software, the color copiers become both high-end scanners and color printers. A complete solution also requires the purchase of a PostScript RIP (Raster Image Processor) as a front-end for the copier. The NeXT performs pre-

processing of black-and-white images internally, allowing for considerably less expensive "dumb printers." According to Rob Poor, the NeXT developer advocate responsible for the Canon relationship, there are technical reasons why the operating system cannot yet perform similar internal processing for the Canon printers.

The cost of the total package, including the PostScript RIP, will range from \$47,500 for a system that includes a CLC300, to \$71,995 for a CLC500 system. Canon will also release a new Color BubbleJet Copier A1 configuration in the near future.

Canon introduced its line of color copiers in 1987 and dominates this market and has the largest U.S. market share of the entire copier market. The NeXT/Canon bundles will be marketed to service bureaus and large in-house corporate printing operations.

The deal may be the first step in a deeper relationship between NeXT and Canon involving color printers. At a press conference here, Steve Jobs said that "we believe color printing will be very important in the near future." Discussing the need for low-cost color printers, Jobs said, "you'll be seeing some very exciting technology with Canon next year." ♦

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Sales Watch

As NeXT continues to gain market share, we'll keep track of some of the larger purchases.

Customer	Application	# of Units	Major Software
Osaka University Osaka, Japan National university	Teaching tool for science and computer science curriculum and courseware development	400	Interface Builder, Diagram!, Improv, SAS, Mathematica
First National Bank of Chicago Chicago and London Banking and securities trading	Capital markets applications to support trading and risk-management business	80 (Aug.) 50 (Oct.)	Improv, Mathematica, Word Perfect
Pinole Point Steel Richmond, California Steel manufacturing	Materials Requirement Planning, financial analysis, inventory tracking	40 (Oct.) 60 (Jan., 1992)	Custom software from Bayard Open Systems and Oracle

Lighthouse

[CONTINUED FROM PAGE 1]

outline are fully visible as they are moved from place to place. Multiple views of the same outlines can be constructed for different audiences and managed from a view browser.

When displayed in slide view, each major headline and its sublines appears as a separate page. A slide-sorting feature allows users to select individual slides for further editing or for changing the order of slides. Users can design one or more master slides using a palette of design tools and by dragging in any EPS or TIFF image that will appear on each individual slide.

The slides can be output to a printer, 35mm slide recorder, or to the screen. For on-screen slide shows, the program can be set to take over the full screen, and a variety of transitions are available for special effects between slides. Voice annotations can be attached to play during a slide show.

Lighthouse said it anticipates users will want to send presentations via NeXTmail, so a "prepare for mailing" feature packages related documents into an e-mail message.

NeXTstep 3.0

[CONTINUED FROM PAGE 1]

• a significantly faster implementation of the NXBitmapRep class, which will effectively allow programs such as SoftPC and co-Xist to directly access the screen for dramatically increased performance

• an integrated help system.

Unlike the transition from NeXTstep 1.0 to 2.0, sources say that version 3.0 will not constitute a major operating system overhaul. Many of the features being added to the system are primarily in response to requests from third-party developers who had problems with the 1.0 and 2.0 system software.

Other features that were only partially implemented but disabled in NeXTstep 2.0 – such as support for multiprocessor systems – will be operational in 3.0.

Other new features are provided for programmers, including:

• NeXT's proprietary B-Tree package and an application pro-

grammer's interface to allow programmers to access the words and definitions inside the NeXT's on-line Webster's dictionary

• added support for internationalization of applications

• modifications to Interface Builder so that custom objects can have their own custom connections inspector.

According to a member of the development team who spoke at a recent Bay Area NeXT User Group developer meeting, Version 3.0 will retain the version 2.0 Text Object, the NeXT's mini-text editor used by most applica-

tion programs that allows text-field input. The Text Object will be rewritten for Version 4.0, he said.

Sources said NeXTstep 3.0 will run on the base NeXT configuration: a monochrome NeXTstation with 8MB of RAM and a 105MB hard disk. The operating system will work with both 68030- and 68040-based workstations. NeXTstep 2.0 application programs should run under 3.0 without modification or needing to be recompiled, but NeXTstep 1.0 application programs will probably not work without changes. ♦

RightBrain

[CONTINUED FROM PAGE 1]

a reduced view and to rotate a graphic by dragging its corner.

Reid said he was not trying to break any new ground with the feature set of his program, but to do "ten to twenty percent better than anything you've seen before doing the same old stuff." He said that the program would be available in the first quarter of 1992. No price has been set.

In introducing Reid, NeXT CEO Steve Jobs said that four page-layout programs were under development for the NeXT. Currently, the only layout program available is FrameMaker, which is best suited to highly formatted documents. Pages Corporation of San Diego showed an early version of its program earlier in the year and hopes to ship in mid-1992. Jobs declined to name the other two, but said that one should be announced early next year and the other later in 1992.

PasteUp's approach to document creation spans the middle ground between the structured document and pasteboard approaches that have traditionally defined page-layout programs. Reid described the method as

"experimenting until you find what you like." Columns are defined loosely at first, by dragging a column-creation tool, but once the designer is satisfied with the look, the program can regularize the grid. According to Reid, elements can be defined either as a master page or as a stand-alone design.

The program uses a variety of floating tools, including a palette that displays the user's selection of EPS and TIFF images, which will probably ship with the program as separate utilities. Reid also plans free-floating rulers, which can be dragged to any point on-screen, shortened or lengthened by dragging, be joined to form a T-square, or switched into a centering mode that stretches the ruler at both ends when one end is dragged.

The program shares some characteristics with TouchType, which was developed by Reid for Right Brain but was later sold to Adobe Systems. Right Brain also ships LockScreen, a screen saver utility for the NeXT. The company is located at 132 Hamilton Ave., Palo Alto, CA 94301. 415/326-2974; fax 415/326-2977. ♦

spooler allows a variety of PostScript output devices to be connected either to the Macintosh network or to the NeXT network, with all users having access to all printing resources. The software is fully compatible with the Apple Filing Protocol. uShare 2.05 costs \$1195 per desktop, the Print Spooler an additional \$495. IPT: 805/541-3000.

Top Draw 2.0 was scheduled to ship in October with an introductory price of \$149 until January. The updated version incorporates a new user interface, full NeXT color support, and multiple-page capability. After January, the price will be \$395. Contact Media Logic at 213/573-7575.

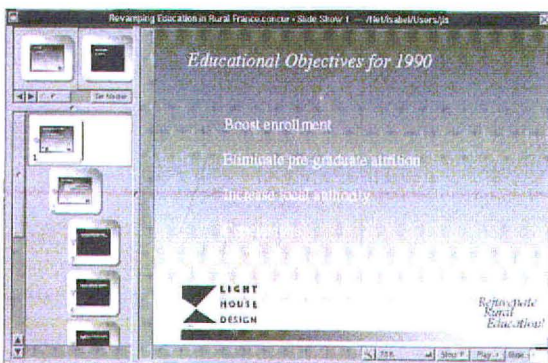
System board upgrades incorporating the Motorola 68040 chip for owners of the original 68030 cube increased from \$1395 to \$2495 as of November 1. NeXT announced the move several months in advance to allow users to upgrade before the price increase. The increase was necessary, according to NeXT, to reflect the product's "true cost."

Epitome shipped the beta of Redmark, a groupware product designed to allow users to proof-read, edit, comment, and annotate documents. The long-awaited product is expected to ship in December for \$285. Educational discounts and site licenses are available. Epitome: 615/675-0910.

The Dycam digital camera is being distributed by Prism Technologies of Sudbury, Ontario, with Prism software that stores up to 32 images, which are then transferred to the NeXT. The digital grayscale point-and-shoot camera weighs 10 oz., is cordless, rechargeable, and has automatic exposure and flash. The camera is available now for \$995. Prism Technologies: 705/523-5528.

Reed College presented Steve Jobs with the Howard Vollum award for Distinguished Accomplishment in Science and Technology. He donated his \$2000 prize to provide wages for students working in Reed's physics department. He was cited in part for "being the technological champion of liberal education." Jobs attended Reed College in the mid-1970s.

Pixel Magician, a universal picture file viewer [SEE PROPS, NEXT PAGE]



Screens in Concurrence are organized according to an outline structure, created in a separate window and shown graphically to the left of the

main screen. Changes in the outline are shown on the presentation screens and vice versa. Design styles can be changed globally.

BRIEFS
CONTINUED

and translator for NeXT computers from B&B Software Systems, was announced at Seybold. Working through the NeXT services menu, it will support PICT1, PICT2, TIFF, TGA, GIF, RAST, PCX, BMP, IFF, EPS, and MTV formats, among others. It will be available as of November 1 for \$150. B&B: 213/820-9145.

Lotus Development launched *Improv news, views and, clues*, a newsletter for users of its *Improv* product. The first issue was dated Summer 1991. According to Lotus, all users who register their copy of *Improv* receive the free newsletter automatically. Lotus: 617/693-7903.

FrameMaker 3.0 shipped on October 2, not in August as was erroneously reported in the September *NeXTWORLD Extra*. Its retail price was reduced from \$995 to \$795. Frame Technology: 408/433-3311.

The SAS Application System is now shipping on the NeXT computer. SAS is a large-scale data entry, storage, and manipulation system. It includes modules for report writing, statistical analysis, and project management. Unlike most personal computer software, the SAS System is licensed on a yearly basis. First year license fees begin at \$825 and increase for each module added. Renewals are at a lower price. SAS Institute: 919/677-8000.

A compression and backup utility called *Tarre* started shipping from Aurora Software on October 1. The program is based on the UNIX tar and compress programs. It operates in a stand-alone mode and as a service within other applications. *Tarre* costs \$29.95. Aurora Software: 608/231-3679.

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Editor: Dan Ruby; Manager: Darcy DiNucci; News Editor: Dan Lavin; Staff Writer: Simon L. Garfinkel; Layout: Sue Troy; Copy Editor: Eliot Bergson

Appsoft

[CONTINUED FROM PAGE 1]

version will be priced at \$299. Buyers of the current version will receive the upgrade for free.

NeXT unbundled the full version of WriteNow from new systems sold after September 30, but the company continues to include with the machines a read-only version that can open WriteNow documents, including the on-line documentation for many existing NeXT applications, but not save or print them.

Pixelist is an image-editing program written by Keith Ohlfs, a NeXT employee and the developer of the bundled application icon, on which Pixelist is partially based. Adams said that it would ship within about three months, and might be sold in two versions, one for high-end graphics applications and another for general users.

Similar in concept to Adobe Photoshop for the Macintosh, Pixelist includes more-extensive paint tools and a superior user interface, Adams said. Among its key features is Composite Lab, with which users can take advantage of NeXT's alpha channel color implementation to combine multiple images. Pricing has not yet been set.

According to Scott Shlechter of LEK, who will sit on Appsoft's board of directors, WriteNow and Pixelist are "the launching pad for a complete family of NeXTstep applications that will cover both all the tried-and-true software categories and compelling new stuff."

Appsoft was created in part

because of NeXT's desire to find an outside publisher for WriteNow (see *NeXTWORLD Extra*, September 1991). Although some observers have commented that Appsoft appears to have a special relationship with NeXT, Adams said that he had not heard any complaints about unfair competition from other NeXT software developers.

Apple/IBM

[CONTINUED FROM PAGE 4]

ented," and "best of breed," which are often associated with NeXT technology.

While some technologies produced by the alliance will be made available for licensing by other companies, "NeXT would have to

"We are hitching our wagons to NeXT. We can do more for the platform than major publishers like Lotus and WordPerfect, which are simply porting their programs from other environments," he said.

In addition to Adams, Appsoft employees include Dan Rians, director of product marketing, and programmer Don Jordan, the author of Silicon Press for the Mac-

intosh. Other top managers will be named soon, Adams said.

The company would not disclose details of its deal with NeXT or the amount of funding from LEK. "It is going to take a lot of money to open up this market," Shlechter said.

Appsoft Inc. is located at 300 Hamilton Ave., Palo Alto, CA 94301. 800/428-2777.

bringing something to the table," said Apple president, Michael Spindler.

IBM executives did not close the door on its possible use of NeXTstep. "It's not dead," said Bill Filip, vice president for workstations at IBM, but he termed the once-planned relationship "unlikely."

HSD

[CONTINUED FROM PAGE 4]

keting for Abaton, evidently referring to NeXT's anticipated 3.0 update of its system software. Marlow explained that the company was unwilling to devote proper engineering resources to any needed upgrade.

HSD, by contrast, is committed to the NeXT market and is projecting more than \$3.5 million in

1991 sales, according to company president Dave Peter. The company will bundle the modem with its OCR Servant character-recognition product at a price targeted to be under \$500. Given OCR Servant's \$295 price tag, Peter describes the deal as getting a fax modem "almost for free."

The fax modem will be available beginning November 1 exclusively

According to Filip, IBM would have liked to have used the NeXTstep on its machines as originally announced, but the two parties were unable to come to an agreement. He characterized the stumbling block as "principally a business issue."

through the NeXT worldwide dealer network. NeXT Connection will no longer carry the product. Peters declined to divulge specifics of his arrangement with Abaton.

Peter is actively seeking other products that fit with the company strategy of selling value-added peripherals. "We've made money in this market and we're looking to reinvest it," he said.

Virtuoso

[CONTINUED FROM PAGE 1]

performance advantage." The company said that some Virtuoso operations were twice as fast as the same operations on FreeHand on a Macintosh IIx. Alstys software engineer Mark Skaggs attributed the speed in part to new coding

and in part to the faster processor of the NeXT system.

Virtuoso uses the same native file format as FreeHand, enabling files to be seamlessly traded across platforms. Virtuoso will also read Illustrator files from any platform, along with EPS and TIFF formats.

Missing from the NeXT product in this release is FreeHand's new ability (available in version 3.1) to use the Wacom Graphics Tablet for pressure-sensitive drawing effects.

Alstys is at 269 W. Renner Rd., Richardson, TX 75080. 214/680-2060; fax 214/680-0537.

Sullivan heeds new Agency directive: Just the facts

Crammed in his coach seat on the way back from NeXT's big Seybold week, Lt. Sullivan shook his head over the embarrassing revelations coming out of the Gates hearings. Seems the analysis boys over in Langley never let facts get in the way of an expedient opinion. No reason to slant the data in the NeXT dodge, he mused.

Sullivan was surprised during the show to run into Steve Jobs (NeXT), Bruce Henderson (Pages), and Paul Brainerd (Aldus) in deep and fervent conversation. Apparently, Brainerd regrets his hasty response to last year's request for help with the PageOne product. Jobs wants PageOne released with an Aldus label for reasons we all understand, but Pages isn't nearly as interested these days after accepting venture capital backing.

There were some funny doings down at the booth, too. Tempers flared when Cube Technologies was prevented from showing the slide film back to its film recorder, apparently as a result of NeXT's "interpretation" of its Display PostScript license with Adobe that it covers output devices only up to 900 dpi. Another last-minute cancellation was Abacus's Executor Mac emulator. Maybe NeXT wasn't ready to face Apple's legal fury.

Borland has given the definitive word on the fate of PowerStep. After strong bidding from both Pages and Appsoft, the company has hired Joe Amirato from the original PowerStep team to head Borland's spreadsheet development. Finally, someone with clout at Borland knows the true value of the PowerStep engine, and it looks like it will be used to improve Quattro. There might even be a release of Quattro for the NeXT platform.

Motorola is working hard on faster versions of the 68040 processor and should have something to give NeXT fairly soon. A Motorola engineer told Sullivan that future NeXT machines really would need to have 60-nanosecond RAM

or better to take full advantage of the speed of this processor. Eighty ns would not allow memory access quickly enough to let the CPU give its best performance.

Then there are all the whispers circulating about NeXTstep and the Intel 80486. Selling NeXTstep in a shrinkwrapped box would open some eyes in the PC crowd, stimulating desire for NeXT's "real hardware" as well as making

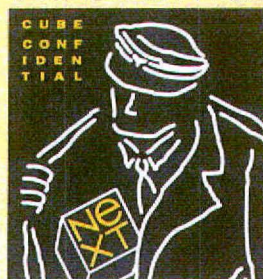
NeXTstep even more attractive to developers. The competition in the '486 marketplace is SCO's OpenDesktop and, next year, SunSoft's Solaris 2.0. Head to head against those guys, NeXTstep is the clear winner. The internal debate seems to favor making the plunge sometime next year.

It was a very interesting scene at the inaugural meeting of the California ISDN User Group. NeXT was much better represented than any other computer manufacturer, having infiltrated virtually the entire CIUG, a prestigious organization influencing the installation of ISDN services, setting of service rates, and establishment of ISDN technology standards. It looks like NeXT will have a representative on every subcommittee. Why all the interest in ISDN? Sullivan hears that NeXTstep 3.0 will offer the user a set of ISDN tools.

Finally, Sullivan made a note to call his broker about Sybase's now-public stock. Sources say the price for the database product (server and client) will almost double at the end of the year. Those in the know are snatching up Sybase as quickly as they can fill their purchase orders.

Help keep those intelligence estimates on the level. E-mail tips to the Lieutenant at sullivan@nextworld.com or call his voice mail at 415/978-3374. But don't call the Agency. They've got enough problems.

Lt. Sullivan



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NEWS BRIEF

After Karnig left NeXT's Developer Relations Group on November 1 to become the new general manager of Appsoft Corporation, the NeXTstep software company best known for WriteNow. Previously developer advocate for graphics and publishing software at NeXT, Karnig played a role in such NeXT third-party software successes as the introductions of Adobe Illustrator 3.0 and TouchType, Altsys Virtuoso, MediaLogic's TopDraw 2.0, and Stone Design's Create. All Appsoft employees except founder Randy Adams report to Karnig.

Stained Glass Software in October stopped production of Calidoscope for the NeXT computer. Existing customers will not be supported. Stained Glass remains in business with its consultation services, a company representative said. Stained Glass: 415/968-5000.

NeXT is developing an interface and driver for the Tektronix Phaser 3RX phase-color printer. Currently, the NeXT can print in the \$14,000 Phaser 3, which supports Adobe PostScript Level 1. NeXT owners will be able to purchase the Phaser 3RX, which lacks a PostScript interpreter, for \$2,000 less. The project is scheduled to be finished in mid-1992.

Whoop 'n' utilities, a series of business utilities run from the services menu, is now shipping from Paget Press. The system includes an envelope printer, a lecture printer, a service-based interface to the UNIX tar and compress programs, and a utility for adding numbers and columns to a word processor document. Introductory price is \$99. Paget Press: 206/448-0845.

Microtech International is manufacturing a NeXT-labeled removable hard disk drive for delivery to a unnamed government agency. As part of its order for a large num-

[CONTINUED ON PAGE 4]

Jobs discloses plans for IPO; lays off 30

by CLAIR WHITMER

Redwood City, CA - In back-to-back revelations last month, NeXT Computer announced the layoff of at least 30 employees while at the same time disclosing its intent to become a public company, possibly within 18 months.

Attributing the layoffs to changes in sales and marketing strategies that had bypassed some positions, NeXT let go of approximately five percent of its 600-employee work force. The cuts came from all areas of the company, including five people from the engineering department, usually a sacrosanct area in a start-up technology company.

A company spokeswoman said the cuts were related to third-quarter sales, which NeXT officials confirmed were disappointing (see story, page 3).

The company is "flirting with profitability," said NeXT CEO Steve Jobs, and a reduction in costs could make the bottom line more attractive. But, he added, the savings won't show up until next year.

[CONTINUED ON PAGE 3]

NeXT stepping over to 486-based machines

by LAURIE FLYNN

Redwood City, CA - Seizing an opportunity in the mainstream PC market, NeXT soon will make its NeXTstep operating system available for Intel 486-based computers, according to sources. The announcement is scheduled for early 1992.

The disclosure comes during a period of confusion created by the dissolution of the once mighty IBM/Microsoft alliance and IBM's subsequent realignment with Apple Computer. The offspring of that realignment, Taligent Corporation, is not expected to offer a product for at least two years. Likewise, Microsoft's Windows NT environment, part of the Advanced Computing Environment initiative, isn't expected to be fully object-oriented until late 1992 at the earliest.

Although he declined to comment specifically, NeXT CEO Steve Jobs hinted strongly that NeXTstep soon would become available on more-mainstream platforms than the Motorola-based NeXT computer. "A lot of our customers have told us that there is a lot of iron that they have already bought, and we have listened," said Jobs, speaking at Unix Expo in New York last month. The company confirmed that it is currently running NeXTstep successfully on four different processors in its labs. Some industry sources contend the company is also developing a version of NeXTstep for Sun SPARC systems.

A version of NeXTstep for 486-based [SEE INTEL, PAGE 4]

Canon color printer engine may be NeXT-bound

by DAN LAVIN

Las Vegas - Canon USA introduced a new printer engine at Comdex that may show up in a future NeXT color printer, according to sources.

In October, NeXT CEO Steve Jobs said that NeXT would use Canon color printer technology in a future product.

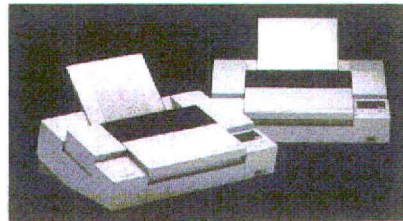
The new engine uses a bubble-jet ink-on-demand technology. While this method is not new, printers using similar technology typically cost tens of thousands of dollars. Canon printers using the new engine cost under \$3000.

The mechanism includes four separate print heads sending between one and thirty-six drops of color at 360 dpi each. This yields one-pass printing and achieves the important goal of continuous-tone color. Also important is the printer's capability to print to plain paper.

Sources contend that 400 dpi is NeXT's minimum design goal for a color printer, which means that

Canon would have to produce a special version for NeXT. According to Al Hebert, senior systems analyst at Canon, the engine would require more nozzles to achieve this resolution.

[SEE CANON, PAGE 4]



Canon's new printers may be the basis for NeXT upcoming color printer.

Estimated growth of 486-based PC market, worldwide

1990	146,000
1991	700,000
1992	1.9 million
1993	4.5 million

Source: IDC

OOP vendors prep for battle

by SIMSON L. GARFINKEL

New York - If the recent Unix Expo was any indication, the industry's premier operating system vendors are gearing up for a battle royale over object-oriented technology.

In a keynote address that ran 45 minutes over schedule, NeXT CEO Steve Jobs asserted that commercial users are buying UNIX workstations to develop "mission-critical custom applications" that are beyond the scope of what is possible on Macintosh or MS-DOS computers. These companies are now discovering that object-oriented programming can reduce the time it takes to develop such a program from two years to just 90 days, he said.

The proven power of object-oriented programming explains why companies like Apple and IBM are now trying to develop new object-oriented operating systems, said Jobs. "The problem is that it takes five to six years to develop a new system," he said. "I saw Microsoft try to copy the Macintosh. It took them eight years."

But when asked why companies desiring object-oriented systems shouldn't [SEE UNIX EXPO, PAGE 4]

INTERVIEW

Rich Page looks ahead

NeXTWORLD Senior Editor Simson L. Garfinkel recently visited NeXT Vice President of Hardware Engineering Rich Page for a spirited interview on NeXT's plans for evolving its technology, its role in the computer industry, and its relationships with suppliers.

Processors

NW: What do you see as the growth potential for the 68K processor family? I've been told that the problem with the 68K is that it's a CISC machine and it's going to cost more and more to make it run faster. And Motorola is going to be more interested in doing something with the RS/6000. People think that NeXT's best deal is to stay with the 68K for a year or two and then go to RS/6000 or SPARC.

RP: You have one of two choices: Go with a unique processor and choose it for technical advantages, and then use those advantages to differentiate yourself in the market; the other way you can go is to pick one of the processors commonly used in the marketplace and then pick something else to differentiate yourself, so you aren't a "me-too."

You have problems no matter which way you go.

NW: Well, is there an eventual problem with the 68K? Will NeXT have to switch off it at some point?

RP: I think that the answer there is maybe. Presently, the 68K offers us the best price/performance for available processors. We just think that it's faster and cheaper than the alternatives, but that may not hold up. So then the question is, what do you switch to? You've got to find something that has a better cost/performance trade-off, and something that has a future to it. A year or two ago, you might have been inclined to pick MIPS. Yet if you'd done that, today you would be asking yourself, "Why did I pick MIPS? It looks like they're going out of business."

NW: That basically leaves SPARC, 88K...

RP: It's Intel, Motorola, SPARC, Power-PC, and MIPS, and that's your choice. And Motorola has two choices: 68K and 88K.

NW: And you don't want to go with Intel, because...

RP: You jump from one CISC machine to another. And they charge you extra for DOS compatibility; it's a known fact. So you're left with 68K, 88K, SPARC, Power-PC, and MIPS.

NW: How do you make that decision?

RP: You pick the one that you think is best, and you make the best product that you can. But presently, it looks like the 68K is the cheapest in its class of performance for a reasonable period of time.

Presently, we have the only working product in the sub-\$5000 range. IBM was supposed to ship a RS/6000 this fall for under \$5000, and there was an announcement a month ago that they've slipped it out a year. HP had a similar announcement. In terms of a complete stand-alone machine—hardware, software, monitor, keyboard, disk—I believe that NeXT is the only company shipping a workstation for less than \$5000. Everybody else leaves out something. They either leave out memory, or they leave out the disk.

Keyboards

NW: Everybody hates the new keyboard. What are you going to do about it?

RP: Well, in the long run we'll probably change our keyboard, and hopefully people will like that. Sometimes you make improvements and people don't like them, because they don't like any change. What happened on this one was that in the process of internationalizing and solving certain problems, we caused certain problems—like moving the backslash and the pipe for the UNIX folks. That was probably a mistake. Hopefully we can fix that in the future.

NW: What about third-party keyboard support, like Apple Desktop Bus keyboards? Are there plans to make them work?

RP: Maybe.

I think that what people want is the ability to carry their NeXTstation around and use it when they get there.



The optical disc

NW: Let's talk about the optical disc. Was that a mistake?

RP: Probably...

Basically, what happened was that the combination of the Winchester and the optical disc made a good product, but it was too expensive. And the optical-only system didn't work very well. So we ended up with a system that was too expensive and not fast enough. That's why we went and did our present set of products.

But there's another part to it. The thing that was nice about the optical disc was that it was roughly the same size as the 330MB Winchester. That made it very easy for customers to load a new operating system onto the disk or to back up the operating system.

Unfortunately, what people wanted was a Winchester and floppies. Most customers don't care that it might take 30 floppies or more to load their Winchester. What this tells me is that most customers, even educated ones, really don't pay attention to the backup problem.

Japan and laptops

NW: You spend a lot of time in Japan. How is your relationship with Canon working out?

RP: It's working out fairly well. We have a good relationship with Canon. It has gotten to the point that they're an investor, a supplier, and our sales force for Japan and the Far East.

NW: Do they do any design work?

RP: Well, they design their own products, some of which we buy, like the laser printer. They made a contribution to the Kanji system. That's [NeXTstep] 2.1.]

NW: What about other Japanese suppliers?

RP: Unfortunately, we buy a fair amount of product out of Japan. It's the only place to get certain things—like memory. We get a fair amount of our memory from Motorola, but we can't get all of our memory there.

NW: They don't make enough?

RP: Yeah, and I don't think that we want to be sole-sourced for memory. And unfortunately, if you want to go looking for a flat-panel display or a number of other products, there isn't any other place you can look.

NW: Does that mean that you're working on a laptop?

RP: We're looking for a display. It's something that we're looking into but haven't really made any progress on.

NW: What are the real issues in bringing a NeXT portable to the market?

RP: The biggest issue is this: Presently, to build a NeXTstep computer, you need a

significant performance level, you need 8MB or more of memory, you need a certain amount of hard disk. That minimum today seems to be around 100MB. And then the other thing you need is a certain minimum amount of screen real estate. Now the question is, what's that minimum? With a portable, maybe you don't necessarily need a million pixels.

NW: Is a million-pixel flat panel just beyond the state of the art right now?

RP: I've seen one or two that look okay, but to get a good-quality display will probably take a couple of years.

NW: Let's say two years from now NeXT brought out a portable. How much would it cost?

RP: Well, there are some portables available today. Matsushita built a SPARC laptop [that's distributed only in Japan], and Sony built a News laptop. None of these machines are truly portable, [because] you need to find an outlet or a Sears Die Hard battery. And the displays are fairly poor quality—they have megapixel displays, but they're passive, and the screen response is very low. So if you could get by with that level of screen quality, it would be possible to build one today. But I don't think that either company has sold many because the screen quality is so poor. Unless you absolutely had to have a portable, I don't think you'd be attracted to it. Actually, it surprised me that Sony shipped that kind of display.

NW: For NeXT, what would you want in a portable? Would you want it to weigh six pounds and run five hours on batteries?

RP: Well, I think we're going to have to shoot for something like the Sony News portable workstation, but with a better-quality display. And I don't think that operating on batteries is that important. I think that what people want is the ability to carry their NeXTstation around and use it when they get somewhere. Transportability is the important issue.

NW: And what would you want to see as a price on the machine?

RP: As cheap as possible, but it's going to be expensive. ☛

NeXT forecasts strong growth, despite Q3 softness

CLAIR WHITMER

Redwood City, CA - NeXT Computer is forecasting at least \$40 - \$150 million in sales for the third quarter, despite a soft third quarter, a figure that will more than quadruple their reported \$90 sales of \$29 million.

"We believe that we will beat \$40 million. We feel we're doing very, very well," said NeXT CEO Steve Jobs.

At Unix Expo in New York last month, Jobs said he anticipates sales of \$60 million for the third quarter, compared with \$11 million for the first half of the year. The company will not disclose sales for the third quarter, which closed in September. If the \$60 million figure is accurate, then the company experienced a drastic decline in sales in the third quarter.

Analysts expressed skepticism about NeXT's projected quarterly figures.

"There's no way they're going to go from \$15 million to \$60 million in a quarter," said analyst David Card at International Data Corporation West of Mountain View, California. One view is that NeXT booked third-quarter deliveries in the second quarter to beef up its second-quarter results, which it had all along planned to make public.

Card pointed out that Sun Microsystems also reported a disappointing third quarter in terms of unit sales, which company executives attributed to decreased sales in the commercial market.

A NeXT spokesperson later clarified Jobs's public statement, saying \$60 million was optimistic for the fourth quarter, while \$40 - \$150 million for the year is a low-ball estimate. This could bump up the range of possible third-quarter sales.

NeXT Director of Marketing Mike Slade said that fourth quarter looks "a lot stronger" than third quarter, conceding that the third quarter was "flat, even a little soft."

"I think you will see that the industry as a whole had a disappointing third quarter," said Slade, while adding that any arithmetic based on the \$60 million figure may be misleading.

Speculation about third-quarter results aside, if the company posts \$140 for the fourth quarter, which closes in December, the

overall growth impression would be fairly impressive, according to analysts. This is exactly the kind of financial picture that NeXT needs to project if it is to pursue plans of going public.

"If they were selling in that

IPO/layoffs [CONTINUED FROM PAGE 1]

because of severance expenses. NeXT had hired approximately 300 people during the past 18 months, a period that saw the NeXT system positioned as a "PC on steroids," said Jobs. But sales analyses soon demonstrated that the machine was being purchased by medium and large corporations for "mission-critical custom apps," he added.

This meant that some of the people hired for the original strategy were no longer mission-critical for NeXT.

Though layoffs are always problematic, most analysts seemed nonplused by the announcement. "Thirty people is just about the right proportion compared with what the industry is experiencing,"

said Darcy Fowkes, a research manager at International Technology Group in Los Altos, California. After the layoff decision had been made, but before it was announced, Jobs unexpectedly confirmed that the company intends to go public.

"We're definitely going to go public within 12 to 18 months. And the reason is that our customers want us to," said Jobs at a press conference at Unix Expo last month.

The spokesperson said Jobs had meant the statement as an off-the-cuff confirmation of a common assumption, but it served to soothe anxieties caused by the layoffs.

— Dan Lavin contributed to this story.

RightBrain prepares four utilities

by RICK REYNOLDS

Palo Alto, CA - Right Brain Software has developed four products to ship by the end of December, including three utilities spun off from the development of Paste Up, its forthcoming page-layout program, as well as a screen saver.

Developed from Paste Up, Rulers is a utility that enables users to resize, scale, and join rulers, allowing for clean and efficient sizings, alignments, and centerings. Portfolio acts as an extension of

the shelf in the Workspace Browser, while the LaunchPad utility is a similar extension of the Dock.

LockScreen functions as a user-configurable screen saver and works in monochrome or color mode. The utility also can seal a workstation from curious passers-by by requiring a password.

Each program is \$99, although site licensing can bring the prices as low as \$30 per machine. RightBrain Software is at 132 Hamilton Ave., Palo Alto, CA 94301. 415/326-2974 or 800/472-7246.

New books from Addison-Wesley

Addison-Wesley will begin publishing this month five books in the NeXT Developer's Library, including:

NeXTstep Reference - A guide to the NeXTstep development environment. (1008 pages, \$44.95, ISBN 0-201-58136-1).

Sound, Music, and Signal Processing on a NeXT Computer: Concepts - A guide to the concepts and design of sound and music software. (512 pages, \$39.95, ISBN 0-201-58146-9).

Sound, Music, and Signal Processing on a NeXT Computer: Reference - A detailed

reference to the API for each piece of sound, music, and DSP software. (512 pages, \$39.95, ISBN 0-201-58131-0).

NeXT Operating System Software - A description of Mach, the version of UNIX used by the NeXT. (240 pages, \$24.95, ISBN 0-201-58131-0).

NeXT Development Tools - A description of the tools available for developing a NeXT application, including the NeXT editor, compiler, preprocessor, and debugger. (336 pages, \$26.95, ISBN 0-201-58132-9).

WSJ ads test OOP strategy



by ELIOT BERGSON

Mountain View, CA - NeXT Computer unveiled a new, two-tier advertising and marketing strategy in October and November specifically designed to "leverage on the media Apple and IBM have gotten" from their recent announcement to develop an object-oriented operating system, according to Karen Steele, NeXT's marketing/communications manager.

Previous advertising efforts centered on the arrival of new products for the NeXT, such as WordPerfect or the Motorola 68040 chip. The current strategy, developed and implemented with CKS Partners in San Francisco, focuses on the NeXTstep user

interface, which allows users to develop custom, object-oriented applications in a very short time.

In the first phase, ads that ran for six weeks in the *Wall Street Journal* targeted decision-makers in business and finance. "We're building an awareness campaign - awareness through viability. We have customers with success stories, and we want to get that out," said Steele.

The ads included an 800 number readers could call for more information. Callers are told of a series of seminars, scheduled through resellers and regional sales offices, to give potential customers hands-on experience with the machine.

The strategy seems to be paying off. "About 40 percent of our calls are what we call 'qualified leads,' customers ready to buy within the next three months," said Steele. "We're getting responses in financial services, higher education, government, publishing... even legal and medical are up."

The second phase of the campaign was launched in mid-November. Ads targeting programmers and MIS managers appeared in *Unix Today*, *Communications World*, and *PCWeek*, specifically designed to "go into the details of object-oriented programming for those who understand it best," said Steele.

Expo registration opens

by CLAIR WHITMER

San Francisco - Registration pricing has been set for the upcoming NeXTWORLD Expo, to be held January 22-24, 1991, at the Civic Auditorium here.

Hosted by NeXT Computer, NeXTWORLD Magazine, and World Expo Corporation, the conference will combine a two-day trade show and user conference with a developer's conference on the third day.

Advance registration for the trade show is \$25. For \$95, users can register for the full user conference, including keynotes and panel discussions. After December 30, prices will increase to \$40 and \$150, respectively.

The developer's conference, for registered NeXT developers only, costs \$395. After December 30, the price will increase to \$495.

The expo is expected to draw more than 5000 professionals from around the world.

In the keynote address, NeXT CEO Steve Jobs will outline future NeXT technology and strategies. Other speakers from NeXT, third-party developers, and user groups will address technology and marketing concerns. Users will also be able to gather practical tips and techniques during the user track.

To register, or for more information, call World Expo Corporation at 800/545-EXPO.

BRIEFS
Continued

ber of NeXT workstations, the agency required NeXT to supply a storage device with a fully removable drive mechanism. Microtech designed, tested, and shipped the product for NeXT in only 90 days, sources at the two companies said. NeXT is considering whether to put the drive on its standard parts list.

Vivid Publishing has chosen RightBrain Software to market its TypeView program, a stand-alone utility that allows a user to easily view any single character or entire character set of a font. Extra information such as the number of kerned pairs or copyright information is also available. The Show Bezier option displays the internal construction of a character. The software is available for \$129. RightBrain Software: 800/472-7246.

The Font Company's collection of 1500 PostScript Type 1 typefaces is no longer available in NeXT format. The Font Company is referring existing NeXT customers to a local user group. PostScript typefaces still are available from RightBrain Software and Adobe Systems. The Font Company: 602/998-9711.

A high-end accounting package for the NeXT is under development by Phoenix Data Trend, a Calgary, Alberta-based provider of time-sharing-based accounting services. The system, called Cornerstone, uses Syquest as its underlying relational database system. A stripped-down version will be available next May; the full system will be out in October 1992, according to Phoenix. Price for the full system should be about \$5000. Phoenix Data Trend: 403/248-3282.

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Editor: Dan Ruby; Managers: Darcy DiNucci, Laurie Flynn; News Editor: Dan Lavin; Staff Writer: Simson L. Garfinkel; Layout: Sue Troy; Copy Editor: Eliot Bergson

NeXT gets high marks among education users

by DAN LAVIN

San Diego - NeXT's strong appearance at the Educom trade show in October suggests that interest in NeXT within universities is accelerating while at the same time narrowing into mathematically oriented departments.

According to Ronald Weissman, NeXT's director of strategic marketing, higher education still accounts for between 25 and 33 percent of sales worldwide.

"We are focusing on certain departments, but we are spending some time developing general rela-

tionships," said Weissman. "NeXT is already the number-two-selling computer at important campuses like Stanford and MIT."

The majority of new NeXT applications had a mathematical bent. Among them was a differential equations course from the University of Nebraska at Lincoln and a complete first-year curriculum in science, engineering, and mathematics from Rose-Hulman Institute of Technology, located in Terre Haute, Indiana. Among the commercial developers displaying new software was Maple Software, showing a math program.

Unix Expo

[CONTINUED FROM PAGE 1]

just use NeXTstep today, Bill Filip, president of IBM's advanced workstation division, attacked NeXT's technology as not being truly object-oriented.

"NeXTstep is implemented as a layered-object technology approach; it's the same approach as OS/2 and System 7," Filip said. "Pink is a ground-zero object structure. We believe it will be

more productive by optimizing object technology down to the microkernel. . . . The [Pink] kernel is an object."

In another press conference a few hours later, Jobs responded: "Sometimes, technical people don't understand the depth of what they are talking about. NeXTstep uses Mach. It's a full object-oriented system."

Intel

[CONTINUED FROM PAGE 1]

machines could open up NeXT's market to millions of PCs at both the workstation and server levels. By the end of 1991, the installed base of 486 machines will be about 850,000, according to Bruce Stephen, analyst at IDC in Framingham, Massachusetts.

"It's clear [Jobs] has to expand his hardware base," said one industry analyst. "If he stuck only to the Motorola he'd have a problem if he wanted to be in the mainstream."

The real question is whether customers of Intel machines would

be interested. According to one analyst, that will depend on the customer's application. "If customization is the real issue, probably, but if backward compatibility is the issue, probably not."

The strategy is consistent with NeXT's new emphasis on its object-oriented system software, rather than its hardware. "We believe, and we have been told by our customers, that our system software is one of the most important competitive advantages that we have," said Mike Slade, NeXT's director of marketing.

Canon

[CONTINUED FROM PAGE 1]

But, Hebert added, operating at 400 dpi and driven by an external PostScript processor, the printers could achieve quality levels required for some final

production and service-bureau applications.

At the show, Canon introduced two Canon-branded printers for the PC and Mac, based on the engine.

NeXTstep has at least one leg up over Taligent, the company formed by IBM and Apple to offer an object-oriented environment: availability. Apple Computer President Michael Spindler said that the company would not be showing its object-oriented Pink operating system until 1992 - and then only to select, undisclosed customers.

"We will show Pink when Sys-

tem 7 is [moved] to RISC," said Spindler, referring to the company's plans to port its System 7 operating system to the new PowerPC RISC microprocessor currently under joint development by IBM and Motorola.

Within the next two years, Taligent will make part of its object-oriented system available "in a layered form, to enhance existing products," Filip said.

'Deep' encounter in a DC parking garage

Expo fever is running high enough to overcome any chill caused by layoffs or third-quarter results. Even the normally skeptical Sullivan let those details roll off his back. Now the IPO, that will be interesting. Foremost in his mind, though, as he rolled his unmarked Agency sedan to an isolated corner on the third floor of the D.C. parking garage, were the rampaging rumors about NeXTstep on other platforms.

A tall figure in a trenchcoat stepped out of the shadows. Forget about the RS-6000, he said. SPARC is iffy at best. But developers and users would be wise to start thinking about NeXTstep on the 80486. Like, for example, how do you ship an app for more than one platform? Do you need separate packaging, or perhaps separate disks, for the different binaries? Sullivan's source says no. Multiple binaries could fit in the same app wrapper. The user sees one file. The machine knows which part of the code to run.

Sounds like nirvana for users with a big '486 installed base. But it's not that simple. Only '486 machines equipped with special graphics buffers will handle NeXTstep's graphics routines. Only a few installed machines are so equipped, but a handful of Intel clone makers may be working on special NeXTstep boxes.

Sullivan has been unable to nail down whether or not Developer Conference attendees will get NeXTstep 3.0 betas at NeXTWORLD Expo. NeXT isn't certain it can handle full beta distribution at this early stage. In any case, the conference will function as a "3.0 camp" in many ways. If betas do ship, they'll come on CD-ROM, so get yourself a SCSI CD-ROM drive for your NeXT. You can wait for a NeXT-specific drive, but there is also an inelegant solution. Buy an AppleCD SC drive and hook it up to your NeXT computer. It works better with NeXT than with a Macintosh anyway.

So what do you get with this new version of the operating system anyway? A lot. Support for PostScript Level 2 (with your own NeXT look-up table in the CIE color space). Pantone Matching System. A new API for the digital signal processor (Motorola 56001 DSP) chip. Support for 1.4MB Macintosh floppy disks. And a lot more.

Create a successful computer, and great games will inevitably follow, regardless of the thousands of MIS managers who would swear otherwise. In the past several months, both commercial and shareware entries have appeared, and Sulli-

van knows of more in development. Athena is planning to release the 1991 version of Culture Shock in January. While Lighthouse will not do any follow-up to Void, Sullivan was delighted to get a sneak preview of a color version of the in-progress Ragnarok. Other games are in development from MIT to Stanford.

Cash on the barrelhead? Well, not always. Even credit-hostile NeXT has had to face up to the fact that large corporations won't buy on a cash-in-advance basis, so it has begun quietly extending credit to select customers. If you're not among them, ask your NeXT salesman for a credit application anyway. Although

NeXT does not publicize the availability of terms, a credit application is available from the finance department upon request.

Lt. Sullivan



While Apple ships a Motorola 68030 emulator with all 68040-based machines, NeXT has bitten off a bigger bite. Insignia Solutions has been retained to write a Motorola-680x0 emulator for NRW. While NRW (as in "NeXT RISC Workstation") is not expected until late '92, when it does come there will be a workaround for software to support the RISC machines. Insignia, famous for DOS emulation, seems like just the right solution for this task.

While Ashton-Tate's PowerStep was only a cult favorite as a commercial spreadsheet product, it seems to have found more ardent admirers now that its in exile at Borland. Both Pages Corporation of San Diego and Appsoft Corporation of Palo Alto have been attempting to snap it up. Pages

sees PowerStep as the foundation of a nice charting package for PageOne. Appsoft envisions a traditional spreadsheet for the mainstream business market who don't like newfangled paradigms and fixing things that weren't broken. So far, Lt. Sullivan hasn't been able to tell how things will end, but it is very possible Borland has its own, non-NeXT uses for the PowerStep technology.

Sullivan jotted down this last tip, then looked up for more, but Deep NeXT had already disappeared.

Sullivan plans on making the rounds of Expo parties, and he is busy planning his own underground event. The best way to get your invite is to first share your tips with him by sending email to Sullivan@nextworld.com or calling his voicemail at 415-978-3374. Don't call the Agency, though. No reason to tip off the bean counters about those party expenses.